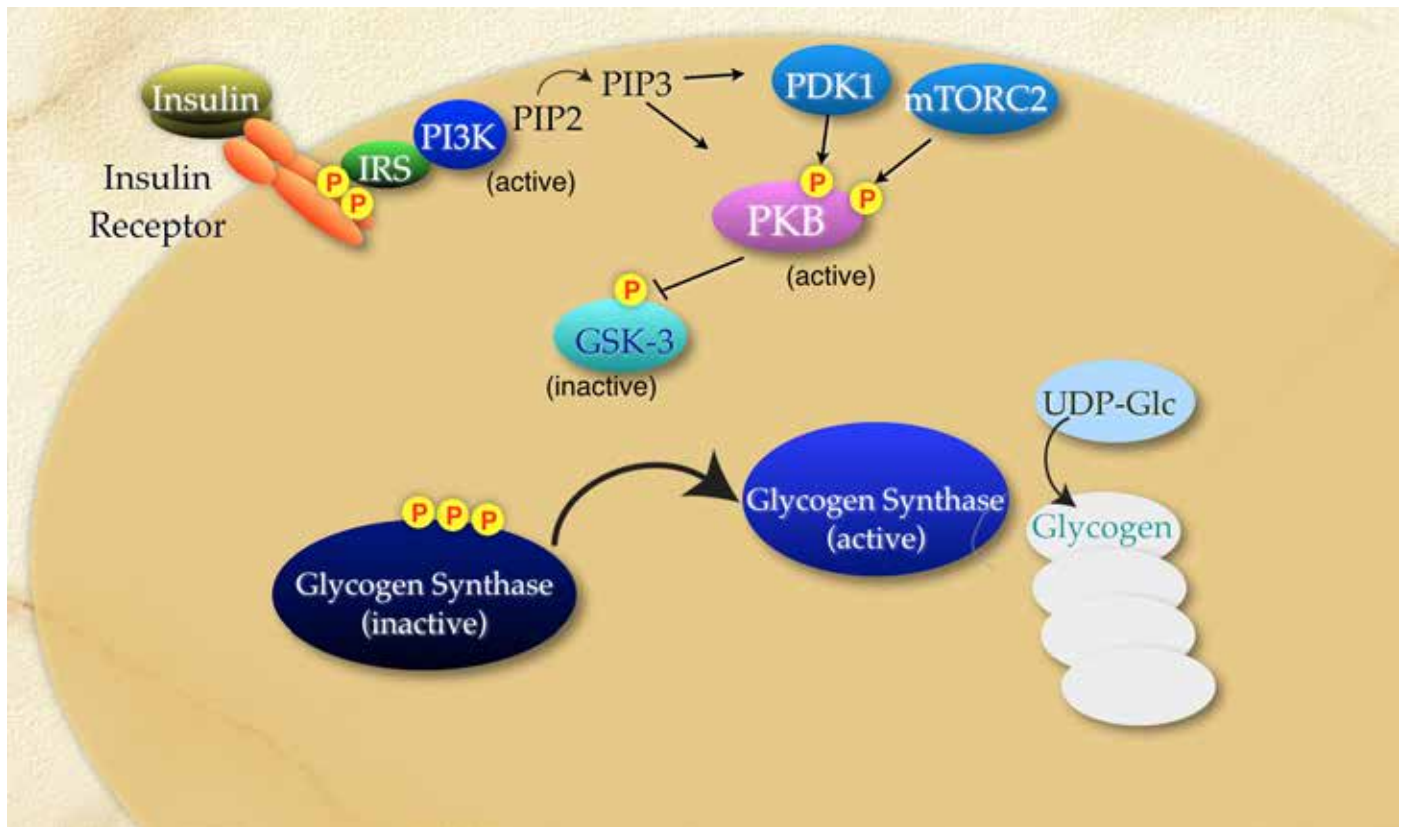


Bulletin



The Canadian Society for Molecular Biosciences
La Société Canadienne pour les Biosciences Moléculaires

2018
www.csmb-scbm.ca



Bulletin



The Canadian Society for
Molecular Biosciences
La Société Canadienne pour les
Biosciences Moléculaires

2018

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CSMB Board for 2018



The CSMB Board at their executive meeting in Montreal, November 2018. Standing (from left to right): Tarik Möröy, Nafisa Jadavji, Jan Rainey, Christian Baron, Bensun Fong, Imogen Coe, Julie Poupard (CSMB Secretariat and Webmaster), Paola Marignani, Frances Sharom. Seated (from left to right): Phil Hieter, Hans-Joachim Wieden, Jim Davie, Kristin Bates, Walid Houry. Michelle Scott was connected via Skype.

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President's Report 2018

Dr. Tarik Möröy



CSMB President, Tarik Möröy

2018 was a very important year for CSMB, since we have seen real progress in realizing our mandate to represent Canadian researchers from the fields of biochemistry, cell biology, molecular biology, and genetics. We were able to promote issues that are of critical importance to our members and the research community in molecular biosciences: increased funding for discovery research, but also adherence to rules ensuring equity, diversity and inclusion. As is equally important, we have enabled communication and collaboration among all scientists from the disciplines represented by CSMB through our meetings, and been successful in helping the next generation of researchers succeed in their careers, be it in academia, industry or at the entrepreneurial level. I have highlighted some of the main events and achievements of 2018 below.

Fundamental Science Review

This year, CSMB, together with many scientists and scientific organizations, has led advocacy campaigns for an increase in funding for open operating grants to support fundamental research and scientific discovery that is investigator- and curiosity-driven. The Fundamental Science Review (FSR) that was led by David Naylor set the targets and arguments for this effort, and made clear and concrete recommendations. The federal government has been receptive to the input of the scientific community and implemented the recommendations of the FSR – at least in part. Budget 2018 showed a clear commitment by the government to increased funding of fundamental science and discovery research. CSMB welcomed this turnaround and applauds the new measures and increased funding lines. I would like to take this opportunity to thank all CSMB members, and in particular my colleagues from the CSMB board of directors, for their efforts to support the FSR recommendations. The many meetings with government decision makers, ministers and members of

parliament, the science marches and twitter campaigns and their engagement with U15 university presidents, industry leaders, and the scientific community at large have paid off. I would also like to underline the commitment of CSMB to working closely with the Chief Science Advisor to the federal government, Dr. Mona Nemer. Her role in clarifying to the federal government the issues at stake with respect to funding of discovery research was key to success in our effort to support the FSR recommendations.

Towards a consolidated funding base for discovery research

In spite of all the positive news that can be found in Budget 2018, there is still a long way ahead of us to make Canada competitive again among the world's leading nations in scientific discovery. Not all of the recommendations of the FSR have been followed by the federal government, and Canada still falls short compared to other nations that are at the forefront of science and research, such as the U.S., and many European and Asian countries. Many of these nations are implementing so called "excellence strategies" for their universities and research centres by providing budgets that are not reached in Canada. Therefore, CSMB urges the federal government to maintain its commitment, and to implement all FSR recommendations in full, to ensure that Canada maintains a place among these nations in scientific research. CSMB has therefore submitted recommendations for the pre-Budget Consultations in advance of the 2019 Budget to the House of Commons Permanent Committee on Finances (FINA). CSMB has outlined in its FINA recommendations that more has to be done in particular for fellowships at all levels, and also to increase the funding line for discovery research, and augment the investments for research overhead through the Research Support Fund. CSMB was in line with other groups in Canada, such as

Research Canada, in its recommendations advocating for increased research funding, and is confident that the Federal Government will make an effort to fully implement these recommendations.

Conference on “Membrane Proteins in Health and Disease” April 2018

This conference has been held every 4 years since 1986 and was a great success this year again. The meeting was held at the Banff Centre in April, and featured topics ranging from structural biology, protein biogenesis, and membrane transport to membrane proteins as therapeutic targets. Many thanks go to the organizers, who have demonstrated their competence in organizing conferences that are not only informative, but also provide added value for trainees and give CSMB a high visibility within the scientific community. We were honoured to announce at this meeting a number of outstanding colleagues as winners of various awards: the CSMB New Investigator award (Dr. Katey Rayner, Assistant Professor, University of Ottawa Heart Institute and Department of Biochemistry, University of Ottawa), the Senior Investigator award supported by the Canadian Science Publishing Group (Dr. Richard Rachubinski, University Professor of Cell Biology, University of Alberta) and the Arthur Wynne Gold Medal, which was awarded to two outstanding colleagues this year, Dr. Mona Nemer, Director of the Molecular Cardiology Unit, University of Ottawa, and Chief Science Advisor, Government of Canada; and Dr. Jim Woodgett, Professor of Medical Biophysics and Director of the Lunenfeld-Tanenbaum Research Institute at the University of Toronto.

New CIHR President

This year we have welcomed Dr. Michael J. Strong as the new President of the Canadian Institutes of Health Research (CIHR), who took over from Dr. Roderick McInnes, who held the position ad interim after the previous CIHR President, Dr. Alain Beaudet, stepped down. CSMB thanks Dr. McInnes for “holding the fort” at a difficult time, when researchers were unsure about funding levels, success rates, new funding schemes and new mechanisms of peer review. Dr. McInnes has consolidated funding lines to ensure a minimum success rate that allowed many Canadian scientists to obtain new funding and continue their research projects; this was still with difficulty, since budgets remained limited and many good projects could not be funded. Dr.

Strong will have to find a more permanent solution to this situation to avoid previous investments in science infrastructure and the hiring of many talented new investigators being in vain. Interestingly, Dr. Strong, who is an active researcher, will keep his laboratory running while acting as CIHR President. This is a new and unusual combination of tasks, and was widely welcomed by the research community and also by CSMB. Many feel that a CIHR President who at the same time remains an active investigator with his own ongoing research projects will be closer to the reality of science and the intricacies of science funding. Dr. Strong will have to review the reforms of the CIHR funding schemes and their implementation, and the scientific community awaits his decisions and recommendations with anticipation. CSMB wishes Dr. Strong all the best in finding solutions to the funding crisis, and success in the important role that he plays in Canadian health research; he can certainly count on the support of CSMB and all active researchers in health-related biological sciences.

Science advocacy training

The mission of CSMB includes advocacy for all matters touching science and research carried out by biochemists, cell biologists, molecular biologists, and geneticists. One of the key elements in our mandate is the communication of scientific discovery to the public, to whom all scientists working with federal funds and at public universities are accountable. This is not an easy task, since scientists are usually not formally trained to speak to the public in lay terms. We have partnered with the organization “Evidence for Democracy” and put forward a Science Advocacy training webinar for CSMB members. This webinar gave an overview of the situation of science funding and its political context, and gave advice on how to contact political decision makers, either MPs, ministers or heads of agencies, and to convey a clear message that is not only understood, but will have an impact and initiate actions. The goal is to provide participants with new tools to feel confident in meeting with their representatives and advocating for science funding, but also in engaging the public in questions concerning science and research in general. This has become an ever more important issue, in particular since we see certain groups questioning scientific findings and their conclusions for public health. That scientific development and medical discoveries are key elements of our well-being, prosperity and progress appears to be less generally accepted. This may be due

to the ever-growing complexity of scientific discoveries and how they affect our daily lives, and scientists have the responsibility to help communicate their findings, the consequences of their discoveries and their societal implications to the general public.

Women in STEM and Athena SWAN charter

Equity and diversity strengthen scientific research, its quality and social relevance, but also ensure a fair and representative participation of all members of our society. Increasing diversity and gender equity is therefore part of the mission of CSMB. Concrete first steps towards this goal are, for instance, a strict policy of equality and gender balance at our annual conferences. All CSMB-led events have to maintain a gender balance on panels, discussion groups, speaker lists and organizing committees; an effort that extends also to the composition of the CSMB Board of Directors. CSMB's Vice-President, Dr. Imogen Coe, former Dean of Science at Ryerson University and Professor in the Department of Chemistry and Biology, and also affiliated scientist in the Li Ka Shing Knowledge Institute, Keenan Research Centre, at St. Michael's Hospital, is one of the most active CSMB members advocating for EDI. She recently published an article in a special issue of *The Lancet* entitled "Advancing women in science, medicine and global health". In this review article she discusses measures and best practices to promote gender equity and equality in science and medicine. She also attended the launch of this *Lancet* special issue in London, U.K., in the presence of members of the Canadian Institutes of Health Research. The enormous efforts that Dr. Coe is making to implement EDI standards in Canadian academic communities have been recognized by a particular distinction: next year she will receive the Angela Hildyard Recognition Award in Equity, Diversity and Inclusion. Congratulations go out to Dr. Coe from all members of the CSMB board!

Outlook

As members of CSMB, we can be proud to have contributed significantly to renewing the interest of the federal government in science and discovery research. The positive consequences of our advocacy efforts, and in particular the actions taken by past presidents and CSMB board members Drs. Phil Hieter, Kristin Baetz and Christian Baron and many "at large" members, were effective and resulted in the long-awaited increases in tri-council funding in Budget 2018. But we also have

witnessed other changes in the way we promote science and research among our members and colleagues from coast to coast to coast by implementing strict EDI principles in CSMB-led events, also as a result of the many actions taken by our EDI champions. 2018 has not only demonstrated that scientists have a strong voice in Ottawa, but also that CSMB can be a powerful driver for societal change. I am certain that this is a strong motivation to renew your membership and to motivate all your colleagues and trainees to join CSMB, since there is much more to do to ensure that molecular biological science will continue to flourish in Canada. Together we will be as successful in the coming years as we have been in 2018 in reaching our goals and following our mission.

Incoming Members of the CSMB Executive Board



Dr. Imogen Coe

Dr. Imogen Coe, Vice-President

Dr. Imogen Coe arrived in Canada as an international graduate student at the University of Victoria, B.C., following a B.Sc. (Hons.) degree in biology from the University of Exeter and K-12 schooling in Cambridge, UK. Her graduate work was in neurobiology (M.Sc.) and comparative molecular neuroendocrinology (Ph.D.) followed by post-doctoral training at the University of California, San Francisco (UCSF), investigating the role of nucleoside transporters in modulating the effects of adenosine in cellular responses to ethanol. She was then awarded an Alberta Heritage Foundation for Medical Research Post-doctoral Fellowship which supported her return to Canada at the Faculty of Medicine, University of Alberta (Biochemistry & Oncology). Here, her research focus shifted to the role of nucleoside transporters in the entry of nucleoside analog drugs involved in anti-cancer, anti-viral and anti-parasitic therapeutics.

In 1997, Dr. Coe was recruited to York University in the Department of Biology and in 2012 she was recruited as the founding dean of the newly formed Faculty of Science at Ryerson University, where she completed a successful term in 2018. Dr. Coe's research lab is based at St. Michael's Hospital in downtown Toronto, and she continues to work on the structure, function and regulation of nucleoside transporters.

In addition, to her work as a scientist, Dr. Coe is internationally recognized as a Canadian thought leader in the area of equity, diversity and inclusion (EDI) in science, technology, engineering and math (STEM). She has advised academia, government and industry on best practices and approaches to improve EDI in STEM, particularly in the Canadian post-secondary education (PSE) sector. She has written about these issues extensively, both nationally and internationally, for platforms such as the Globe and Mail, The Lancet, the CBC and Times Higher Education, and is much in demand by academia, industry and government as a speaker and panelist. She has received numerous awards for her advocacy work in support of EDI in STEM and sits on several advisory boards related to science communication, healthcare and innovation.



Dr. Walid Houry

Dr. Walid Houry, Councillor

Dr. Walid A. Houry is Professor in the Department of Biochemistry and in the Department of Chemistry at the University of Toronto. He obtained his M.Sc. (1991) and Ph.D. (1996) from Cornell University and then did his post-doctoral training at the Sloan-Kettering Institute (1996-1997) in New York City, and at the Max Planck Institute of Biochemistry (1997-2000) in Munich, Germany.

His research interests lie in the general area of cellular stress responses and the role of molecular chaperones and ATP-dependent proteases in these responses. To this end, his group utilizes various structural, biophysical, biochemical, proteomic, and cell biological approaches to understand the mechanism of function of these chaperones and proteases. His group is also interested in the development of novel anticancer drugs and antibiotics by identifying compounds that target these chaperones and proteases and result in the dysregulation of protein homeostasis in the cell. His work has been recognized by several awards, including Visiting Scientist of the National Research Foundation of South Africa, Tokyo Biochemical Research Foundation Award, Canada Foundation for Innovation Leaders Opportunity Fund, Canadian Institutes of Health Research New Investigator, and Premier's Research Excellence Award.

Dr. Houry is currently an associate editor of *Frontiers in Molecular Biosciences* (2014-present) and on the Editorial board of *Journal of Biological Chemistry* (2017-2022) and *Microbial Cell* (2014-present). He also served as an editor on two Henry Stewart Talks series, and as a special editor for *Biochemistry and Cell Biology*. He has organized, or helped to organize, several international and national meetings, including Keystone symposia.

In addition, Dr. Houry has served in several administrative capacities, including as Acting Chair of the Department of Biochemistry, University of Toronto (2018) and as Associate Chair (January 2012-June 2014 and July-December 2016), as Director and principal applicant for the CIHR training program grant in "Protein Folding and Interaction Dynamics: Principles and Diseases" at the Department of Biochemistry, University of Toronto (March 2002-May 2015), and as Director of the Proteomics and Mass Spectrometry Centre at the Faculty of Medicine, University of Toronto (January 2005-December 2007).

Minutes of the 61st Annual General Meeting 2018

Banff, Alberta – Thursday April 12, 2018

Attendees: P. Hieter; J.-H. Wieden; T. Patel; R. Reithmeier; W. Stanford; C. DeKraker; J. Rainey; J. Casey; T. Alexander; R. Johnston; J. Weiner; F. Duong; J. O'Neil; L. Munter; I. Coe; B. Fong; N. Jadavji; T. Mörröy; C. Baron; K. Baetz; F. Sharom; C. Brett; M. Scott

1. Welcome and President's remarks:

Hieter indicated it had been a busy and productive year for the Society and recognized the importance of the expanded federal funding for the TriCouncil agencies. He stated that a general discussion with members would follow the conclusion of the formal agenda for the meeting.

2. Approval of Quorum and Agenda

Johnston declared that a quorum was achieved.

Motion: Reithmeier moved and Wieden seconded that the agenda was appropriate. All members approved.

3. Approval of the Minutes of 60th Annual General Meeting in Ottawa, May 19, 2017

Motion: Sharom moved and Mörröy seconded that the previous Minutes were appropriate (subject to the correction of several spelling errors that Sharom would bring to the attention of Davie). All members approved..

4. Business arising from the minutes:

Johnston indicated that the Board had requested that he substitute for Davie as General Secretary for this event, due to an unavoidable Davie family circumstance. Johnston noted that all action items listed for the previous year had been achieved, with the minor exception that it had not been possible to activate electronic voting protocols as earlier hoped. He indicated that a significant improvement in Society finances had arisen following the successful Ottawa meeting, which contrasted to the financial loss arising from the Vancouver international meeting hosted by the Society the previous year. In addition, a series of Board Committees had been created, including Members-at-Large, with the dual intent of improving Board governance and connections with the broader community of researchers. Both steps are anticipated to improve the sustainability of the Society and its continued activities on behalf of members.

5. Secretary's Report:

Membership: Johnston indicated that overall membership had increased from ~600 in 2016 to ~800 in 2017. Most of the increase was due to a growth in student numbers. The numbers of regular members increased slightly, but was still below 300. A brief discussion ensued, focussed on the observation that Ontario had the greatest number of members overall, but with fewer than expected in Toronto. New Board members and Members-at-Large in the Toronto area were urged to advocate on behalf of the Society to their colleagues.

6. Treasurer's Report:

(a) Presentation of the accountant's Reviewed Financial Statement: Rainey provided a detailed analysis of expenses and income for the Society, confirming the improvement in Society finances compared with the previous year. Efforts were underway on multiple fronts to constrain expenses and improve sustainability.

- (b) Acceptance of the Reviewed Financial Statement (2017)
Motion: Stanford moved and Casey seconded that the Financial Statement submitted by the Society be accepted. All members approved.
- (c) Approval of Signing Officers
Motion: Sharom moved and Baetz seconded that Rainey and Davie be approved as Signing Officers on behalf of the Society for the 2018-2019 year. All members approved.

7. Board Membership for 2018-2019 (Baetz):

- a) Call for nominations from the floor: Baetz called for nominations from the floor, and none was received. Nominations were closed.
- b) Councillors and Executive: Baetz reviewed openings on the Board and nominations earlier received and noted that the quality of applicants was very high, making choices difficult. An important goal was to ensure gender, language and geographic balance. After detailed consideration by the Board, a slate of nominees was recommended for consideration by members:
Departing Board Members: B. Karten; J. Nodwell
Renewing Board Members (2-year terms): M. Scott; H.-J. Wieden
New Board Members (2-year terms): I. Coe; W. Houry
Executive Officers (2-year terms): I. Coe for Vice-President; T. Mörry for President; P. Hieter for Past-President (with K. Baetz also continuing as Past-President for 1 year)

Motion: Baetz moved and Fong seconded that the slate recommended by the Board be approved. All members approved.

8. Board Committees and call for volunteers:

Hieter reviewed the creation of Board Committees (Executive, Advocacy & Communication, Membership & Diversity, Finance & Development, Awards, Conference, Nomination and Trainee) and their existing membership, and encouraged Society members who might be interested to submit applications to the Board for membership. These committees are considered very important for improved governance, communication, engagement and accountability.

9. Meeting Reports (Wieden):

- a) ***April 11-15, 2018: Banff***
Membrane Proteins in Health and Disease; attendance is very good and costs have been closely monitored, with a favourable financial result anticipated.
- b) ***June 2-5, 2019: Montreal***
Model Systems in Cancer Research; a draft program is under development and an organizing committee is well established. M. Scott is a Board representative on the organizing committee, with global oversight provided by Mörry and Baron.
- c) ***Call for organizers: CSMB Conference in 2020***
Possible sites are under consideration, including the Toronto area.

10. Other Business/Adjournment

No other business noted

Adjournment to open discussion with Society members, led by P. Hieter, focusing on science funding and the role of the Society in advocacy and communication on behalf of members.

Independent Practitioner's Review Engagement Report

To the Members of the Canadian Society for Molecular Biosciences

I have reviewed the accompanying financial statements of Canadian Society for Molecular Biosciences that comprise the statement of financial position as at December 31, 2018, and the statements of operations and changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Practitioner's Responsibility

My responsibility is to express a conclusion on the accompanying financial statements based on my review. I conducted my review in accordance with Canadian generally accepted standards for review engagements, which require me to comply with relevant ethical requirements.

A review of financial statements in accordance with Canadian generally accepted standards for review engagements is a limited assurance engagement. The practitioner performs procedures, primarily consisting of making inquiries of management and others within the entity, as appropriate, and applying analytical procedures, and evaluates the evidence obtained.

The procedures performed in a review are substantially less in extent than, and vary in nature from, those performed in an audit conducted in accordance with Canadian generally accepted auditing standards. Accordingly, I do not express an audit opinion on these financial statements.

Conclusion

Based on my review, nothing has come to my attention that causes me to believe that the financial statements do not present fairly, in all material respects, the financial position of Canadian Society for Molecular Biosciences as at December 31, 2018, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Numeris CPA

Numeris CPA Chartered Professional Accountant
Licensed Public Accountant
Ottawa, Ontario June 3, 2019

CANADIAN SOCIETY FOR MOLECULAR BIOSCIENCES

Financial Statement

STATEMENT OF FINANCIAL POSITION

As at December 31, 2018

UNAUDITED

	2018	2017
<hr/>		
ASSETS		
CURRENT		
Cash	\$ 11,186	\$ 9,861
Marketable securities - short term (note 3)	266,255	236,115
Accounts receivable	7,156	50,789
Prepaid expenses	13,566	25,032
	<hr/>	<hr/>
	\$ 298,163	\$ 321,797
	<hr/>	<hr/>
LIABILITIES		
CURRENT		
Accounts payable and accrued liabilities	\$ 7,154	\$ 6,163
Deferred membership fees - short term	8,799	3,259
	<hr/>	<hr/>
	15,953	9,422
DEFERRED MEMBERSHIP FEES - LONG TERM	<hr/>	<hr/>
	9,186	5,774
	<hr/>	<hr/>
	25,139	15,196
	<hr/>	<hr/>
	273,024	306,601
	<hr/>	<hr/>
BALANCE	<hr/>	<hr/>
	\$ 298,163	\$ 321,797
	<hr/>	<hr/>

STATEMENT OF OPERATIONS AND CHANGES IN NET ASSETS

Year ended December 31, 2018

UNAUDITED

	2018	2017
REVENUES		
Annual meeting revenue	\$ 110,873	\$ 237,078
Membership fees	25,529	33,236
Investment income	6,642	4,015
Society awards support	5,000	-
Miscellaneous	768	425
	<u>\$ 148,812</u>	<u>\$ 274,754</u>
EXPENDITURES		
Annual meeting (note 4)	86,229	208,660
Board meetings and travel	19,457	10,573
International Genetics Conference	15,570	-
Secretariat	14,505	13,134
Website	8,111	1,646
Student PDF events and travel awards	6,000	2,500
Science advocacy	5,771	4,975
Bank, credit card, and investment management fees	4,712	4,806
Awards expense	4,457	-
Accounting fees	2,375	2,350
Insurance	1,723	1,712
Office expenses	764	474
Bulletin	-	750
	<u>169,674</u>	<u>251,580</u>
(DEFICIENCY) EXCESS OF REVENUES OVER EXPENDITURES BEFORE OTHER ITEMS	<u>(20,862)</u>	<u>23,174</u>
OTHER INCOME		
Gain on sale of marketable securities	5,219	1,173
	<u>(15,643)</u>	<u>24,347</u>
DEFICIENCY OF REVENUES OVER EXPENDITURES		
	<u>(17,934)</u>	<u>7,638</u>
NET UNREALIZED GAIN ON MARKETABLE SECURITIES		
	<u>(33,577)</u>	<u>31,985</u>
DEFICIENCY OF REVENUES OVER EXPENDITURES		
	<u>306,601</u>	<u>274,616</u>
BALANCE, BEGINNING OF YEAR		
	<u>\$ 273,024</u>	<u>\$ 306,601</u>
BALANCE, END OF YEAR		

STATEMENT OF CASH FLOWS

Year ended December 31, 2018

UNAUDITED

	2017	2017
OPERATING ACTIVITIES		
Excess (deficiency) of revenues over expenditures	\$ (33,577)	\$ 31,985
Adjustment for gain on sale of marketable securities	(5,219)	(1,173)
	(38,796)	30,812
 Change in non-cash working capital items		
Marketable securities – short term	(24,921)	(23,044)
Accounts receivable	43,633	(15,297)
Prepaid expenses	11,466	13,378
Accounts payable and accrued liabilities	991	(5,987)
Deferred membership fees – short term	5,540	(84)
	(2,087)	(222)
 FINANCING ACTIVITY		
Deferred membership fees - long term	3,412	437
 NET (DECREASE) INCREASE IN CASH	1,325	215
	9,861	9,646
 CASH, BEGINNING OF YEAR		
 CASH, END OF YEAR	\$ 11,186	\$ 9,861

NOTES TO THE FINANCIAL STATEMENTS

DECEMBER 31, 2018, UNAUDITED

1. NATURE OF OPERATIONS

Canadian Society for Molecular Biosciences (was incorporated without share capital in 1979 under Part II of the Canada Corporations Act and is recognized as a not-for-profit organization for income tax purposes. The main objective of the Society is to foster research and education in the molecular biosciences in Canada.

2. SIGNIFICANT ACCOUNTING POLICIES

The organization applies the Canadian accounting standards for not-for-profit organizations.

(a) Revenue recognition

The organization follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenditures are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

(b) Capital assets

Capital assets purchased at a cost of less than \$2,000 are expensed in the year of purchase. The Society does not own capital assets at this time.

(c) Use of estimates

The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. By their nature, these estimates are subject to measurement uncertainty. The effect of changes in such estimates on the financial statements in future periods could be significant.

(d) Financial instruments

The Society initially measures its financial assets and financial liabilities at fair value.

The Society subsequently measures all its financial assets and financial liabilities at amortized cost, except for investments in equity instruments that are quoted in an active market, which are measured at fair value. Changes in fair value are recognized in the statement of operations.

Financial assets measured at amortized cost include cash and accounts receivable. Financial liabilities measured at amortized cost include accounts payable. The organization's financial assets measured at fair value include quoted shares.

3. MARKETABLE SECURITIES – SHORT TERM

CSMB investments are recorded at market value. As required by CICA Section 3856 unrealized gains or losses on the portfolio as a whole at December 31 are recorded as “Net unrealized gains on marketable securities” and included on the Statement of Operations and Changes in Net Assets.

All amounts below are quoted in Canadian dollars.

	2018	2017
Cash and short term investments	1,145	379
Fixed income	106,662	82,261
Common equity	92,141	87,137
Cash and short term investments (US account)	756	2,811
Common equity (US account)	65,551	63,527
	<u>\$ 266,255</u>	<u>\$ 236,115</u>

4. ANNUAL CONFERENCE EXPENSES

	2018	2017
Speakers travel and expenses	35,621	11,954
Receptions and banquets	32,502	30,680
Meeting organizer fees	8,930	-
Exhibit and facility expenses	4,688	153,877
Supplies and other	2,688	6,723
Awards	1,800	5,426
	<u>\$ 86,229</u>	<u>\$ 208,660</u>

5. FINANCIAL INSTRUMENTS RISKS AND UNCERTAINTIES

The organization’s financial instruments consist of cash, short-term investment, accounts receivable, and accounts payable and accrued liabilities. Unless otherwise noted, it is management’s opinion that the organization is not exposed to significant interest rate, currency, credit, liquidity or cash flow risks. The fair value of these financial instruments approximate their carrying values, unless otherwise noted.

Market risk is the risk that the value of a financial instrument will fluctuate as a result of changes in market prices, whether the factors are specific to the instrument or all instruments traded in the market. The CSMB is exposed to market risk due to the volatile nature of equity investments.

Meeting Report: The 61st Annual Meeting of the CSMB

Membrane Proteins in Health and Disease

R. Todd Alexander, Department of Pediatrics and Membrane Protein Disease Research Group, University of Alberta, Edmonton, Canada, T6G 2H7. todd2@ualberta.ca

Howard Young, Department of Biochemistry and Membrane Protein Disease Research Group, University of Alberta, Edmonton, Canada, T6G 2H7. hyoung@ualberta.ca

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Overview

The 61st annual meeting of the CSMB focused on the topic of Membrane Proteins in Health and Disease. The meeting was held at the Banff Centre in Banff, Alberta from April 11th-15th, 2018. The meeting attracted 179 attendees from 13 countries including Canada, the United States of America, Germany, Norway, France, Austria, Denmark, the United Kingdom, Poland, Kuwait, Sweden, Belgium and China. Participants heard talks from 29 internationally recognized scientists on the subject of the structure, biochemistry, cell biology, and physiology of membrane proteins in both healthy and diseased states. The meeting was organized by the investigators of the Membrane Protein Disease Research Group at the University of Alberta. Joanne Lemieux is the director of the group. The meeting program included 7 plenary sessions (described in more detail below). In addition, there were 15 short talks chosen from the 103 abstracts submitted. The abstracts were presented as posters over two different sessions.

The meeting also featured four CSMB award lectures (more below), a presentation by NSERC outlining funding

opportunities and an honorary lecture by Joe Casey (University of Alberta). Moreover, there was frequent viewing of wildlife, excellent spring skiing, hiking and time in the hot springs! This was also a family friendly meeting, as many invited speakers brought their children, spouses, or families to Banff!

The focus of the meeting was the special group of proteins that reside in one of the many lipid bilayers that enable life. These proteins are distinct in their biochemical and cell biological properties. Consequently, they contribute varied cellular and physiological roles, which is abundantly clear from the disease processes to which they contribute pathogenesis. The meeting delved headlong into all of these subjects. Further, the awesome and inspiring setting contributed positively to numerous discussions on this topic, both inside the meeting venue, at shared meals, and late into the night.

Keynote Lectures

The opening Plenary Lecture was from **David Stokes** of New York University. He described the intriguing structure of the Kdp membrane complex. This unique complex acts as a hybrid potassium pump and channel, and the structure provided by David helped explain how these seemingly dichotomous properties are merged into a potassium transport complex. Midway through the

meeting, the Keynote Lecture was presented by **Sriram Subramaniam**, National Cancer Institute, USA. This tour de force talk presented multiple high resolution EM structures of a variety of membrane proteins, beautifully combining atomic resolution observations on many topics that are as yet unpublished!

Satellite Meetings

During the opening day (Wednesday April 11) there were two separate satellite meetings held. One was hosted by **Michael Overduin** (University of Alberta) and was on the topic of **SMALPs**. This meeting had 10 presenters who discussed the uses of these polymers and newer molecules just coming onto the market in this area of research. The other satellite meeting was organized by **Emmanuelle Cordat** (University of Alberta) and was on the topic of **The Membrane Proteome of pH Homeostasis**. This program included 9 talks from a variety of international scientists on this subject, which spanned structural biology through cell biology and physiology of pH homeostasis in a variety of organisms.

CSMB Award lectures

There were four award talks this year. The first was presented by **Mona Nemer**, University of Ottawa and Chief Scientific Advisor to the Government of Canada. She jointly won the Arthur Wynne Gold medal with **Jim Woodgett**, University of Toronto. Her talk not only described the fascinating role of cardiac-specific transcription factors in congenital heart disease, but also encouraged the audience to be positive and proactive in advocating for science in Canada, while highlighting her long career doing so. The CSMB New Investigator Award was given to **Katey Rayner** from the University of Ottawa, who discussed the role of microRNA transfer between inflamed macrophages. The Canadian Publishing Senior Investigator Award was given to **Rick Rachubinski**, University of Alberta, who highlighted his seminal contributions to peroxisome biogenesis and inheritance. **Jim Woodgett**, the other Arthur Wynne Gold Medal Awardee, discussed the multiple significant contributions he made to our understanding of the function of Glycogen Synthase Kinase (GSK) over the course of his career, punctuated with insights into ways we can all advocate for science in Canada and internationally.

Trainee/Mentoring Sessions

There were two trainee mentoring sessions. The first was held on the opening day by **Joe Casey** and **Joanne Lemieux** from the University of Alberta, who led a

discussion on how to network in a professional manner. The discussion was designed to enable the development of connections and to enhance opportunities in the ever-expanding job market for graduate trainees. The second was led by **Mona Nemer** and **Jim Woodgett**, who held a discussion on science policy and advocacy in Canada.

Honorary Lecture – Joe Casey

A Membrane Proteins in Health and Disease Honorary Lecture was given by **Joe Casey** from the University of Alberta. He has organized the Membrane Proteins in Health and Disease meeting for the CSMB in Banff three times previously (2002, 2010, and 2014), and he was the leader of the Membrane Protein Disease Research Group at the University of Alberta from 2007-2017. He discussed 10 years of research into SLC4A11, initiated by a phone call from a geneticist who had implicated this transporter in eye disease. This work described two new roles for the protein (water transport and adhesion), both of which help to explain the eye disease phenotype and offer new insights into therapeutic strategies.

Plenary Sessions

Membrane Proteins in Need of Therapy

The first lecture in this session by **Gaia Novarino**, Institute of Science and Technology, Austria, detailed the role of a kinase and a transporter (SLC7A), which maintain amino acid levels in the CNS, mutations of which result in autism spectrum disorder. Then **Joe Mindell**, NIH, described two patients whose alteration in lysosomal pH caused by activating mutations in CLC7 resulted in a new, complex disorder with significant neurological manifestations. This was followed by **Joanne Lemieux's** (University of Alberta) description of the role of rhomboid proteases in the pathogenesis of Parkinson's disease. **Anika Hartz**, University of Kentucky, provided insight into the role of P-glycoprotein in the accumulation of A β in Alzheimer's disease, and then **Rajini Rao**, Johns Hopkins University, detailed a novel role for SPCA2 in altered calcium handling in breast cancer.

Structure, Function and Physiology of Ion Channels

Isabelle Baconguis, Vollum Institute, commenced the session with novel insights into the structure of the epithelial sodium channel (ENaC), then **Barbara Niemeyer**, Saarland University, described the role of the STIM proteins in regulating store-operated calcium entry. This was followed by a description of the dynamic regulation of Kv1.2 *via* protein-protein interactions by

Harly Kurata, University of Alberta. The last talk of the first day was from **Tuan Trang**, University of Calgary, on the function of pannexin-1 channels.

Structure, Function and Physiology of Transporters

The session started off with a description of how the ABCC4 organic anion transporter can be targeted to different plasma membranes (*i.e.* apical vs. basolateral) by **Susan Cole**, Queen's University. **Bruce Morgan**, University of Kaiserslautern, then provided new insights into the subcellular homeostasis of glutathione. The session continued with a description of the NBCe1 kidney-specific knockout mouse from **Mark Parker**, University of Buffalo. **Leonid Sazanov**, Institute of Science and Technology, Austria, ended the session with a myriad of high resolution structures of mitochondrial complex I of the electron transport chain from bacteria to mammals.

Membrane Protein Function and Biogenesis

Martin van der Laan, Saarland University, started the evening session off with a description of the membrane-embedded machinery that connects cristae membranes to the inner boundary membrane in mitochondria. Next **Ellen Lumpkin**, Columbia University, provided a compelling visual and auditory characterization of the mechanosensation and neurological signaling that occurs in the excitatory touch response. This was followed by insights into the role of the rhomboid proteases RHBDL4 in Alzheimer's disease from **Lisa Munter**, McGill University, and the session closed with a talk from **Nina Jones**, University of Guelph, who described the role of nephrin phosphorylation in the maintenance of podocyte architecture.

Molecular Events in Membrane Signaling

Terry Hebert, McGill University, detailed elegant mechanisms for determining the varied coupling pathways of GPCRs and then **Janos Peti-Peterdi**, Keck School of Medicine, provided intra-vital microscopic analysis of renal progenitor cells homing in on the *maculae densa* in response to altered whole body volume status. The last talk in the session was from **Derek Bowie**, McGill University, who provided functional insight into glutamatergic signaling via structural approaches.

Molecular Insights into Membrane Biology

Poul Nissen, Aarhus University, started the session off with the description of a FRET-based approach to understand the transport properties and dynamics of

a P-type ATPase. This was followed by a demonstration of the structural basis for selective small molecule inhibitors of the lipopolysaccharide transporter MsbA by **Christopher Koth**, Genetech. **John Rubenstein**, University of Toronto, completed the session with some beautiful high resolution structures of rotary ATPases.

New and Notable in Membrane Biology

The last session started off with a biophysical description of ligand-receptor interactions in the apelinergic system from **Jan Rainey**, Dalhousie University. This talk was followed by a lecture from **Chris Brett**, Concordia University, who demonstrated how lysosomal nutrient transporter lifetimes are dependent on the lysosomal intra-luminal fragment pathway. The formal scientific meeting was closed with a talk from **Trevor Moraes**, University of Toronto, who provided structural insights into the bacterial protein Slam, which serves as a translocon for surface proteins.

The Membrane Proteins in Health and Disease meeting has taken place approximately every 4 years for more than 30 years - since 1986 - and the Membrane Protein Disease Research Group plans to host this meeting again at the Banff Centre in April 2022. We hope to see you there!

Career Mentoring Session

CSMB Banff 2018

On Day 3 of the 61st Annual Meeting of the CSMB in Banff, Dr. Mona Nemer, Canada's Chief Science Advisor, together with Dr. Jim Woodgett, Director of Research at the Lunenfeld-Tanenbaum Research Institute, led an audience of over 30 trainees and researchers in a discussion regarding science policy and science advocacy in Canada.

Dr. Woodgett began by discussing the needs of the average Canadian, namely their interests being centrally focussed on their families, their health and their communities, ahead of a diverse range of interests close to their hearts. While scientists are the same, he believes we "rarely justify our work in terms that the public can relate to". While support for fundamental basic research "should be an easy sell", advocacy should not focus on funding, but rather on things "that can be sold to the public and supported universally by stakeholders". He encouraged researchers at all levels to explain our work to politicians and the public, in order to build a consensus with bipartisan support, similar to what NIH enjoys in the US.

Dr. Nemer built off her keynote address: "Just benchmarking and discussing the budget shortfall was not sufficient to convince politicians. What's the narrative, the big deal, if the level of funding is the same as 2006? The government started listening when we pointed out that supporting fundamental science funds the talent piece of the innovation agenda." She noted that scientists directly support the Canadian economy through training, resulting in "people who can go anywhere in life, not just research." She noted that in the coming year, the Federal government will review many aspects of Canadian research, including Centres of Excellence and collaborative networks, but will also evaluate training programs, and increase scholarship/fellowship funding.

A lively open discussion followed. It was generally agreed that while "we may not have immediacy", it is necessary to "intentionally engage" students for realms beyond benchwork. Furthermore, for established scientists, time and resources put towards advocacy cannot be scorned for lack of "professional credit". Rather, it must be a question of science communication becoming an integral and important part of future careers in Canada, as we work towards science being included everywhere that decisions are to be made. Public outreach initiatives including Let's Talk Science were acclaimed, and initiatives on smaller, local levels are encouraged. Attendees were told to reach out to the Prime Minister, Science Minister, and notably local MPs, who may better appreciate the personal stories and efforts of their scientist constituents. While increased "granularity" will be needed to respond to the differing needs of particular fields, there was general optimism about how training today will lead to "interesting" jobs yet to come - as long as scientists continue to advocate for the importance of Canadian scientific competitiveness on the world stage.

Scenes from the 61st Annual Meeting Banff, 2018



Group photo of the Banff meeting attendees



View of the Banff Centre from the Sulfur Mountain gondola



View of the Sulfur Mountain Gondola Summit building from the old cosmic ray station at the top of Sanson's peak



Tunnel Mountain elk herd outside the conference buildings



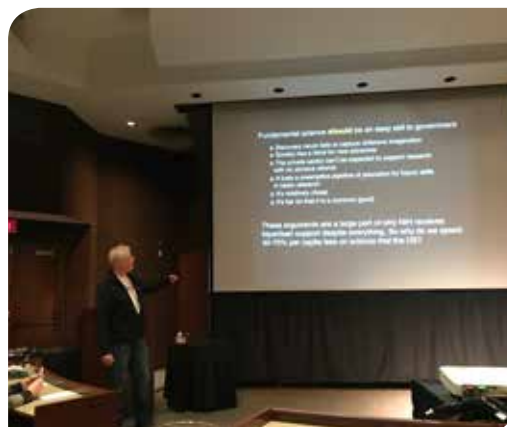
The meeting was opened by the conference co-Chairs, Howard Young and Todd Alexander, from the Departments of Biochemistry and Pediatrics, University of Alberta



Howard Young makes his opening remarks



Lovely morning after a light snowfall



Dr. Jim Woodgett making his presentation at the Career Mentoring Session



Drs. Mona Nemer and Jim Woodgett lead a discussion on science policy and science advocacy in Canada at the Career Mentoring Session





Anatrace, a Gold Sponsor of the 2018 meeting



GE Healthcare, a Gold Sponsor of the 2018 meeting



Beckman Coulter, a Silver Sponsor of the 2018 meeting



Drs. Reinhart Reithmeier and Trevor Moraes (University of Toronto) at the coffee break



Conference participants at the exhibitors' coffee break



CSMB President, Dr. Phil Hieter congratulates Arthur Wynne Gold Medal Award winner, Dr. Jim Woodgett



Dr. Jim Woodgett, Arthur Wynne Gold Medal Award winner, delivers his award talk



Dr. Mona Nemer, Arthur Wynne Gold Medal Award winner, with CSMB Vice-President, Dr. Tarik Möröy



Dr. Rick Rachubinski, winner of the Canadian Science Publishing Senior Investigator Award, presents his award talk



CSMB New Investigator Award winner, Dr. Katey Rayner, is presented with her award by CSMB President, Dr. Phil Hieter



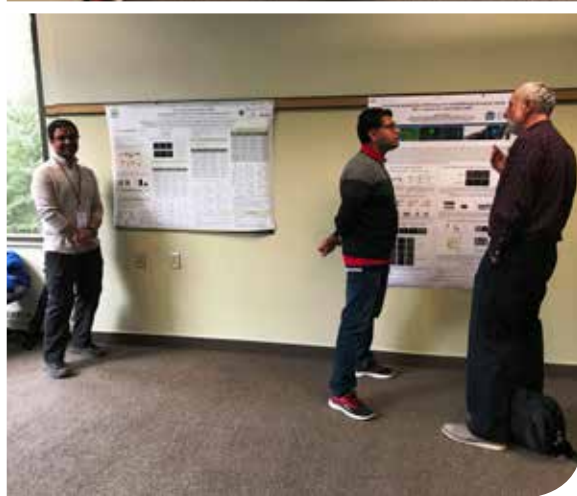
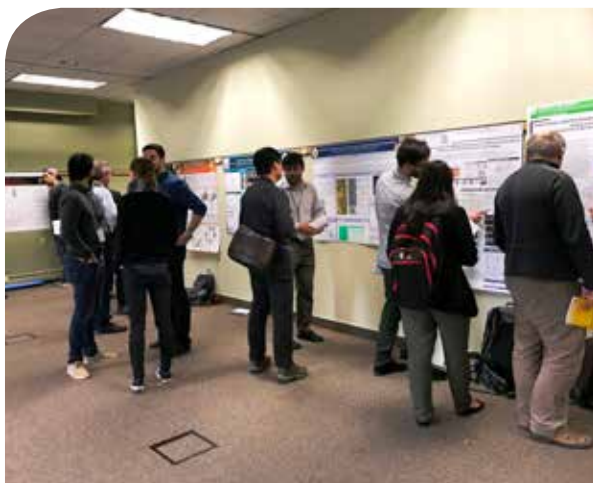
Dr. Katey Rayner delivers her conference award talk



Keynote speaker, Dr. Sriram Subramanian, of the National Cancer Institute US, Center for Cancer Research



Dr. Sriram Subramanian delivers his talk on Cryo Electron Microscopy of Dynamic Molecular Assemblies



Discussions at the poster sessions



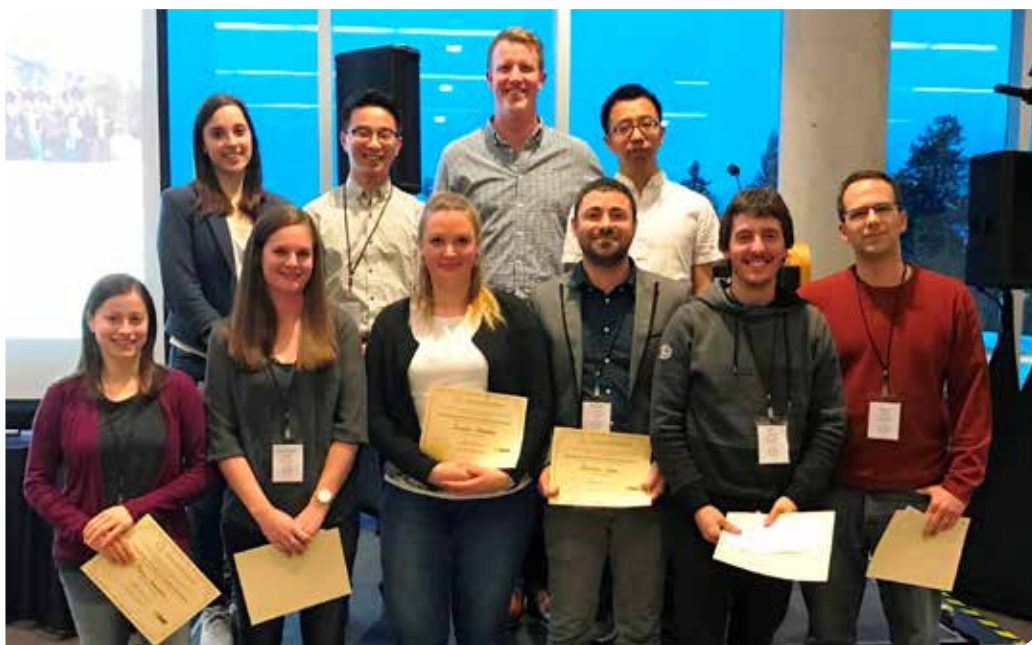
Conference attendees making their presentations



Frosty morning at the Banff Centre



Local wildlife around the conference venue



Poster and travel award winners



Conference attendees enjoying the banquet



Conference co-Chairs Howard Young (left) and Todd Alexander (right) at the banquet



Mountain views from the Banff Centre

Poster and Travel Award Recipients

2018 CSMB Annual Scientific Meeting, Banff, AB

POSTER PRIZES

AWARDEE	UNIVERSITY	SUPERVISOR
Afshan Ardalan	Wilfrid Laurier University	Matthew Smith, Masoud Jelokhani-Niaraki
Bastien Casu	Université de Montréal	Christian Baron
Harveer Dhupar	University of British Columbia	Frank Duong
Eitan Hoch	Broad Institute of MIT, USA	Eric Lander
Jinhong Hu	University of British Columbia	Natalie Strynadka
Maria Ioannou	HHMI Janelia Research Campus, USA	Zhe Liu, Jennifer Lippincott-Schwartz
Justin Lee	University of Alberta	Todd Alexander
Charline Mary	Université de Montréal	Christian Baron
Muntahi Mourin	University of Manitoba	Pavel Dibrov
Pauline Schepsky	Saarland University, Germany	Jutta Engel
Mona Schoppe	Saarland University, Germany	Barbara Niemeyer
Emma Smith	Queen's University	Susan Cole
Igor Tascon	Goethe Frankfurt University, Germany	Inga Hänel
Sean Workman	University of British Columbia	Natalie Strynadka
Eva Zoller	University of Kaiserslautern, Germany	Johannes Herrmann

TRAVEL AWARDS

AWARDEE	UNIVERSITY	SUPERVISOR
M'Lynn Fisher	University of Alberta	Howard Young
Darpan Malhoptra	University of Alberta	Joe Casey
Harveer Dhupar	University of British Columbia	Frank Duong
Mary Hernando	University of Manitoba	Joe O'Neil
Anastassia Pogoutse	University of Toronto	Trevor Moraes
Bala Meenakshi Xavier	University of Ottawa	J.Y. (Eric) Lee
Emma Smith	Queen's University	Susan Cole
Charline Mary	Université de Montréal	Christian Baron

Travel awards were sponsored by CSMB, Bio-Rad, and Avanti Polar Lipids

Trainee Committee Activities 2018

Meet your 2018 CSMB Trainee Representatives

Dr. Nafisa M. Jadavji, post-doctoral fellow, Carleton University

Bensung Fong B.Sc., PhD. Candidate, University of Ottawa



Nafisa Jadavji



Bensun Fong

Other at-large Trainee Committee members: for 2018 were:

Karina Baksh, Ph.D. candidate, University of Toronto

Sarah Chadwick, Ph.D. candidate University of Western Ontario

Dr. Priyanka Mishra, post-doctoral fellow, Simon Fraser University



Karina Baksh



Sarah Chadwick



Dr. Priyanka Mishra

Find us on social media:



<https://csmb-scbm.ca/trainees/>



facebook.com/CSMB-SCBM



@CSMB_SCBM



csmb-scbm

The Trainee Committee held several meetings during 2018 to plan initiatives, outlined below:

1. Trainee questionnaire

The questionnaire was designed to explore how the CSMB could be most useful to trainees. Questions included: which current aspects of CSMB trainee membership are seen as most beneficial, what added benefits are desired, whether trainees would be prepared to pay a nominal fee for a trainee membership, awareness of CSMB student group funding, what type of career options and advice should be provided etc.

Data were collected over a 31-day period in January-February 2018. Results were analyzed, and are available on-line at: <https://csmb-scbm.ca/results-of-the-trainee-questionnaire/>

Next steps included on-line discussions via the trainee Slack community.

2. Information sent to trainees

An e-mail was sent to CSMB trainee members explaining in detail how Budget 2018 will impact trainee members during the next 5 years of their scientific careers.

3. Launch of CSMB-CSCBM Slack community

The CSMB-SCBM Slack Community was launched on September 4 2018. This has enabled on-line introductions, discussions and planning between trainee CSMB members. Please contact current trainee representatives for more details on how to join the community.

2019 CSMB Award Designates

CSMB New Investigator Award

The CSMB New Investigator Award recognizes meritorious research in one or more of the fields of biochemistry, molecular or cellular biology in Canada. Recipients have ten years or less of independent research experience, and demonstrate outstanding research accomplishments.



Dr. Jonathan Schertzer **McMaster University**

Associate Professor, Department of Biochemistry and Biomedical Sciences

Jonathan Schertzer directs the immunometabolism laboratory in the Farncombe Family Digestive Health Research Institute and McMaster Centre for Metabolism, Obesity and Diabetes Research. He completed B.Sc. and M.Sc. degrees at the University of Waterloo, where he was interested in muscle cells and studied how intracellular calcium influenced energy metabolism. He completed his Ph.D. in 2007 at the University of Melbourne where he was studied gene delivery, cell stress, insulin-like growth factors and endocrine control of metabolism.

He then did post-doctoral work with Dr. Amira Klip at SickKids in Toronto where he studied the cell biology of glucose transport and metabolism, but then he got interested in sources of “inflammation” that could influence metabolism. Since establishing a research program at McMaster, he guides scientists to help understand how xenobiotics, diet and microbial stress promote or combat obesity, prediabetes, and diabetic complications. Dr. Schertzer is excited to foster students and fellows to discover new aspects

in the two-way street between host glucose and bacteria (both commensal and pathogenic). Dr. Schertzer has been recognized with New Investigator Awards from the Canadian Institutes for Health Research and Diabetes Canada, and an Early Researcher Award from the Ontario Ministry of Innovation. Dr. Schertzer holds a Canada Research Chair in Metabolic Inflammation, and the lab’s work is funded by the Canadian Institutes for Health Research, Diabetes Canada and the Natural Sciences and Engineering Research Council of Canada.

NRC Research Press Senior Investigator Award

This award recognizes a record of outstanding achievement in research in one or more of the fields of biochemistry, molecular or cellular biology, undertaken in Canada by a Canadian scientist.



Dr. Sylvain Moineau **Université Laval**

**Professor, Department of Biochemistry,
Microbiology and Bioinformatics**

Sylvain Moineau holds the Canada Research Chair in Bacteriophages, and is the Curator of the Félix d'Hérelle Reference Center for Bacterial Viruses, the world largest collection of reference phages. His research group studies phage biology and phage-bacteria interactions.

Among others, he has characterized the mechanisms used by bacteria to resist phages, including his landmark work on CRISPR-Cas systems. Professor Moineau has won several teaching and research awards.

Recently, he was awarded the NSERC John C. Polanyi Award, the Canadian Society of Microbiologists Murray Award for Career Achievement, and the DuPont Excellence Medal. He was also elected to the Academy of Sciences of the Royal Society of Canada and appointed an Officer of the Order of Canada.

Thomson Reuters and Clarivate Analytics have ranked him amongst the most cited microbiologists for the past five years.

Jeanne Manery-Fisher Memorial Award

This award is given in honour of the late Jeanne Manery Fisher, Professor of Biochemistry, University of Toronto. Dr. Fisher was not only an outstanding biochemist, but a remarkable teacher. She was instrumental in creating the Society's Equal Opportunity Committee and fought diligently for the position of women in science. This award recognizes an eminent Canadian woman scientist who has a distinguished career in the fields of biochemistry, molecular or cellular biology or genetics, resulting from her outstanding contributions to research, teaching or society.



Dr. Anne-Claude Gingras, Mount Sinai Hospital

Senior Investigator, Lunenfeld-Tanenbaum Research Institute, and Professor, Department of Molecular Genetics, University of Toronto

Anne-Claude Gingras is the Canada Research Chair in Functional Proteomics, the Lea Reichmann Chair in Cancer Proteomics and a Senior Investigator at the Lunenfeld-Tanenbaum Research Institute, Sinai Health System. A full Professor in the Department of Molecular Genetics at the University of Toronto, she also serves as deputy editor of Molecular and Cellular Proteomics and as a co-director of the Network Biology Collaborative Centre (a Genome Canada technology platform). Her lab focusses on the study of signalling pathways using systematic approaches and the development of quantitative proteomics technologies. She has developed computational tools that enable better analysis and visualization of proteomics results, and contribute to training the next generation of proteomics researchers. Using the tools that she developed, her group has identified new protein complexes and signalling components that provide a better understanding of perturbations associated with cancer and rare diseases. Dr. Gingras has published >200 research articles and review articles that have already been cited 31,000 times.

Anne-Claude Gingras est titulaire de la Chaire de recherche du Canada en protéomique fonctionnelle et la chaire Lea Reichmann en protéomique du cancer. Elle est actuellement professeure titulaire au département de génétique moléculaire de l'Université de Toronto, rédactrice adjointe de la revue Molecular and Cellular Proteomics et co-directrice de la plateforme technologique de Génome Canada "Centre Collaboratif sur la Biologie des Réseaux". Son laboratoire se concentre sur l'étude systématique des voies de signalisation et sur l'élaboration de technologies protéomiques quantitatives. La Dre. Gingras a développé des approches bioinformatiques permettant d'analyser et de visualiser les résultats protéomiques et elle enseigne ces nouvelles approches aux jeunes chercheurs. En employant ces outils, son groupe a découvert plusieurs nouveaux complexes protéiques et membres de voies de signalisation qui sont impliqués dans le cancer et les maladies rares. La Dre. Gingras a publié >200 articles de recherche et de revues scientifiques, qui ont déjà été cités 31,000 fois.

2018 Arthur Wynne Gold Medal

How to continually make the case for fundamental science – a protein kinases' perspective

James Robert Woodgett

Lunenfeld-Tanenbaum Research Institute, Sinai Health System, Toronto
woodgett@lunenfeld.ca @jwoodgett



Summary of the Arthur Wynne Gold Medal talk presented at the CSMB annual meeting held in Banff in April 2018

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It is very easy to lose track of scientific progress. It advances in non-linear fits and starts. Attempts to piece back together the various contributions made towards a significant development are often coloured by voids in contemporaneous evidence, by conflicting opinions, by pressures of claim (whether it be intellectual property/potential for monetary reward or personal gratification/ego) or truly mistaken or distorted memories. Indeed, the tortuous and irregular steps taken, and the dead ends encountered, don't seem very important in light of a true moment of enlightenment. Ask any jurist on a scientific awards committee how easy it is to identify the most important protagonists for a significant advance and they'll usually admit it can come down to a mix of luck, influential colleagues and willingness for self-promotion. This is despite a publication process through which we are supposed to meticulously document, with evidence, each painstaking experimental step. Of course, rarely is the importance of a finding realized at the time it is made - other explanations take time to resolve and credibility of the discovery is inversely proportional to its break from dogma at the time. So there are inevitable gulfs in time between the initial scraps of novel import and the acceptance of major significance. Fortunately, despite our clumsy rambling and errors as researchers, the scientific process works. Time and effort wash away the detritus of experimental design flaws leaving an ever clearer and reliable kernel of new knowledge.

However, just because the scientific progress is ultimately immune to our human flaws does not mean it does us any favours with respect to understanding of how science is done. As a species, we have evolved to accept new developments, to adapt to and assimilate new information and technologies with understanding their genesis. Most scientists, let alone science policy makers, cannot be expert in the breadth of continuous developments. Add to this the impatience for science to find solutions, the extreme technical nature of most research and our unfortunate propensity to make exaggerated promises in exchange for funding considerations and it is hardly surprising that public expectation bears little similarity to how science is actually done. And there is the rub. For if we do not appreciate the foundations of scientific progress, then we will undermine them.

So what's this got to do with a protein kinase, you may legitimately ask? Bear with me. Despite the transient nature of research and its constant reinvention, improved technologies and changing frontiers of understanding, my own research interests have, entirely fortuitously, been anchored around a common theme. It started during my Ph.D. in Dundee in the early 1980s in the laboratory of Philip Cohen, then an emerging leader in the field of glycogen metabolism. He had attracted a group of talented post-doctoral fellows including Brian Hemmings and Peter

Parker, who later made amazing discoveries in signal transduction in their own groups. Brian was following up on some previous work in the Cohen lab which identified multiple protein-serine kinase activities in skeletal muscle that could phosphorylate glycogen synthase, the rate limiting enzyme in glycogen synthesis^{1,2}. Peter worked out how to quantitate the amount of phosphorylation at each of the serine/threonine residues in the protein that were targeted by these kinases. Today, that would be relatively trivial using mass spectrometry (and this was later done) but at the time Peter purified glycogen synthase through a 3 day process from the muscles of rabbits that had been treated with adrenaline or insulin, whilst maintaining the phosphorylation state and then digested the protein with trypsin and separated the peptides by HPLC. He then measured the phosphatase present in each fraction and, knowing which position the various phosphorylation site peptides migrated in the HPLC was able to quantitate them. What he found was profound. While adrenaline increased phosphorylation of residues previously linked to cyclic AMP-dependent protein kinase (leading to inactivation of glycogen synthase)³, the effect of insulin was largely to decrease the phosphorylation of residues targeted by a largely uncharacterized activity termed glycogen synthase kinase-3 (GSK-3)⁴. It was so-named because it was the third activity to be eluted from phosphocellulose¹. This implicated GSK-3 as a possible intermediate in mediating the effects of insulin to promote glycogen synthesis, which, at the time, was a Holy Grail. I'd been working on a couple of other projects but Brian and Peter each left to set up their own labs and hence my relationship with this protein kinase began with a minor study⁵. Indeed, the end of that project yielded a tube of highly purified GSK-3 and all I could think of to do with it was measure its native mass by equilibrium centrifugation.

Soon thereafter I joined Tony Hunter's lab as a post-doc at the Salk Institute as he was an authority on the newly discovered importance of tyrosine kinases in cancer. Despite that, I ended up doing more work on serine kinases such as Protein Kinase C⁶. My lab bench neighbour, Bill Boyle, had started looking at the cellular relatives of the Myb and Jun oncogenes and, entirely by chance we looked at whether my old preps of serine kinases from Dundee had any effect. Sure enough, they both lit up when incubated with GSK-3. Moreover, in a collaboration with Michael Karin's lab, GSK-3 phosphorylation of cJun interfered with its ability to bind DNA and activate AP-1 responsive elements⁷. So what was an obscure kinase implicated in glycogen synthesis doing

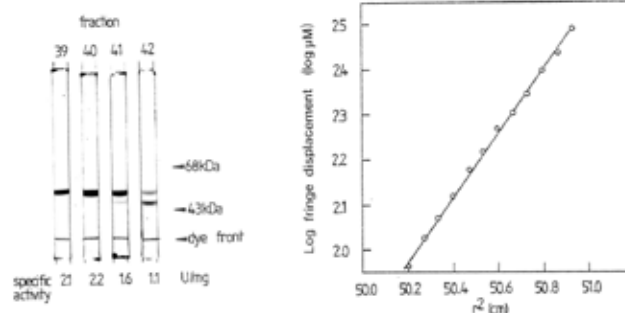


Figure 47. Dodecyl Sulphate Polycrylamide Gel Electrophoresis of Glycogen Synthase Kinase-3.

Electrophoresis was performed using 7.5% gels and migration is from top to bottom. The various proteins were bovine serum albumin (BSA), egg albumin (EgAlb), and the gels show the composition of fractions 39-42 from Figure 40.

Figure 48. High-Speed Sedimentation Equilibrium Centrifugation of Glycogen Synthase Kinase-3.

Performed at 10°C in 40mM Tris-HCl pH 8.0 (pH 8.0) containing 1.0M KCl, 0.05M NaCl and 0.1% (w/v) 2-mercaptoethanol. The plot of log fringe displacement versus square of distance from the centre of rotation was obtained from interference patterns recorded after 30m at 10000 rev/min. The initial protein concentration was 5.2mg/ml and the initial specific volume was assumed to be 0.74ml/g.

Figure 1. Purified GSK-3

Two figures from Ph.D. thesis showing (left) purified GSK-3 separated by SDS-PAGE and (right) estimated native mass by equilibrium centrifugation

kissing up to a cancer-linked transcriptional regulator? I was intrigued enough with that question to decide to invest in going back to studying GSK-3 when I had the opportunity to set up my own group, at the Ludwig Institute for Cancer Research in London, UK. I was attracted in large part by the chance to once again be a colleague of Peter Parker, who, in the intervening years had purified and cloned Protein Kinase C (something I'd totally failed at accomplishing at the Salk). However, through the generosity and mentorship of Steve Hanks, I'd learned enough molecular biology to embark on purifying, sequencing and then cloning GSK-3⁸.

This resulted in a few surprises. Firstly, there were two GSK-3 genes, which we termed alpha and beta. But we weren't the first to clone GSK-3. I used to commute by rail into London and one Thursday morning the train was stuck outside of Euston station (not a rare occurrence) long enough that I'd already read the content of that week's Nature (yes, in paper format, this was 1990 and being on-line for me meant still stuck on a train). So I started reading a paper from Ester Siegfried in Norbert Perrimon's lab in Boston on a fruit fly protein kinase since that was slightly more interesting than staring at a stop signal. It included the sequence of the protein and, having recently laboured over the manual DNA sequencing of GSK-3, I recognized an odd coincidence of peptides. Our own paper was due to be published two weeks later but, once in the lab, it didn't take much alignment to realize that the fly gene was likely the fly orthologue of GSK-3. The new gene was called Zeste-White 3⁹. Rather than being the nom de plume for a detergent, it was called that because it was the third

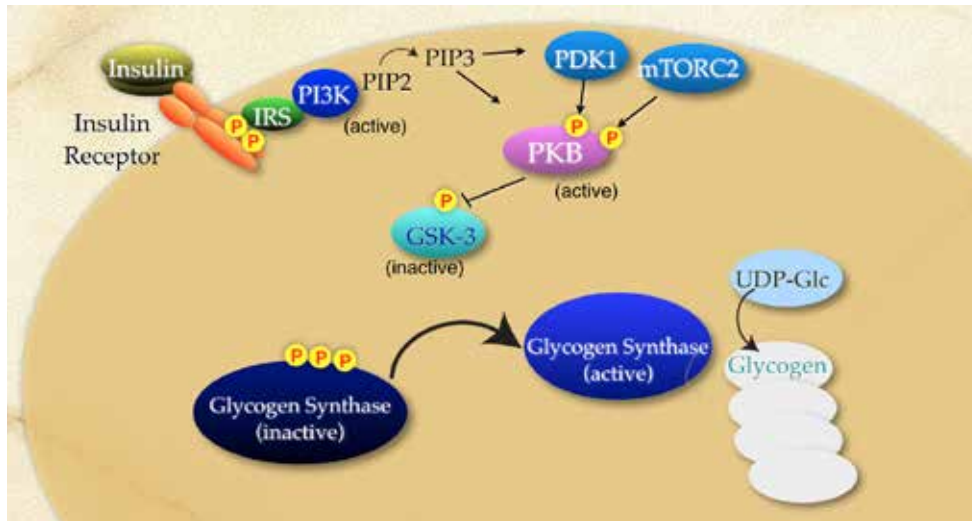


Figure 2. Insulin stimulates glycogen synthesis through PI3K mediated activation of PKB/Akt and inactivation of GSK-3

genetic interval between the zeste and white loci (snooze). After we published the mammalian (actually, rat) GSK-3 genes, the next issue of the journal contained another fruit fly GSK-3 gene isolated by Mark Bourouis and Pat Simpson in Strasbourg that was clearly a spliced variant of Zeste-White3. Because a mutant of this gene displayed extra hairs, they called it Shaggy¹⁰. An infinitely better name.

This is where the proverbial fan became inundated. Three papers, three very different areas of research, collided. Norbert's group was studying the wingless pathway and, through genetic analysis, identified Zeste-White3 as a negative regulator and a maternal effect gene. Pat was trying to understand how Notch acted to define organization of the wing blade and identified a zygotic role for Shaggy. We'd simply been wondering how insulin might work and whether this might be pertinent to cancer. A flurry of papers demonstrated that GSK-3 could rescue the fly mutants and soon thereafter the frequency of adenomatous polyposis coli and β -catenin mutations in colorectal cancer cemented the fields of cancer and Wnt signalling. In another twist, my first graduate student, Paul Coffey, and Brian Hemmings independently had cloned a novel protein kinase we had termed protein kinase B since it was similarly related by sequence to protein kinases A and C. Brian and Philip went on to show that PKB phosphorylated GSK-3 at an inhibitory residue and since PKB has been shown to be activated by the product of phosphatidylinositol 3' kinase that is induced by stimuli including insulin, a compelling mechanism for insulin to reduce Glycogen Synthase phosphorylation was assembled¹¹.

There was also a flurry of cloning studies that led to the identification of GSK-3 orthologues in a variety of

species, from *Arabidopsis* to fission and budding yeast, to nematodes and birds¹²⁻¹⁵. These showed that GSK-3 is a highly conserved gene but more importantly, the effects of its mutation in this multitude of species revealed remarkable insights into regulation of differentiation, hormonal control (auxin signalling in plants), and mammalian development¹⁶. In another "you cannot be serious" coincidence, one of my post-docs in London, Simon Plyte, wanted to clone slime mould GSK-3 and Rob Kay, an expert in the genetics of *Dictyostelium discoideum*, generously offered to host him for a few weeks to screen their cDNA libraries. While there his bench mate fellow, Adrian Hardwood, was using a new technique of restriction enzyme mediated integration (REMI) to screen for developmental mutants. His first characterized hit was GSK-3 (termed GSK-A in *Dictyostelium*)¹⁷. This mutation caused the normally single-celled organism to lose the basic ability to properly differentiate into a multicellular fruiting body in response to nutritional deprivation. Peter Klein, while a post-doc with Doug Melton, noticed that treatment of slime mould with lithium phenocopied the effect of knocking out GSK-3 and went on to show this ion acts as a direct inhibitor of the kinase¹⁸. As a widely used therapy for bipolar disorder, lithium also causes behavioural changes in mice and these changes are mimicked by genetic loss of one GSK-3 allele¹⁹.

These studies encouraged two post-docs, Brad Doble and Satish Patel, to first create conditional alleles of the two isoforms of GSK-3 and then, through Brad's penchant for doing tough experiments, to create an allelic series of embryonic stem cells that he found were highly defective in their pluripotency²⁰ (indeed, Austin Smith's "2i" combination of a GSK-3 inhibitor with a Mek inhibitor enable much modern stem cell research²¹). Satish and another English

fellow, Katrina MacAuley, demonstrated that the two GSK-3 isoforms had quite distinct metabolic phenotypes when disrupted in mice²²⁻³¹, work we are still pursuing in the lab.

You might ask, “that’s cool and all Jim, but what’s that got to do with support of fundamental science?” Glad you asked, as I did get carried away on the GSK-3 Magical Mystery Tour. Did I mention I am somewhat fixated with GSK-3? Let me summarize in the following lessons illustrated by the scientific history (in no order because, science):

1. Scientific progress is not only non-linear, it’s more like a drunken, random pub crawl. Posthoc justifications or explanations to explain how efficient science can be to answering questions are usually manufactured and always simplified (ditto for this story). This is why predicting the future of science is largely a waste of time and testament to our arrogance.

2. Study of fundamental scientific problems can lead to the most remarkable collisions with human diseases, despite unconscious efforts to avoid them. Such insights can be bi-directional so collaborate and be generous with your reagents and expertise.

3. Nothing in science is finished. There is always more to learn and to refine and nature has had a much longer time to find solutions. Diversity of biological models and approaches leads to enormous advantages and can make up for our lack of imagination and, more importantly, our naivety and biases.

4. If you are overly prescriptive of your scientific path and “stay in your lane”, you may well miss opportunities. It is important to define project boundaries for reasons of feasibility, let alone having a life, but always be open to following your nose – it may lead to a view that’s far more beautiful and instructive than your carefully laid plan.

5. Science is pure and without opinion but we continuously corrupt its purity with our ambitions, expectations and the dreary reality of funding. It is essential to explain it in ways non-scientists, even scientists not studying your particular niche, can understand. This means learning to talk about your research in the form of stories. Don’t just show the highlight reel. Science is hard and unpredictable. Understanding that it is difficult but is the best way to realize a better future may lead to better appreciation and support for basic research.

Acknowledgements

All of the people I’ve had the privilege to be mentored by, to have trusted me with my mentorship and have a shared fascination with discovering the unknown. Thanks especially to Peter(s), Pamela, Bernd, Ivan, Eleni, Mike(s), Brian, Colin, Alastair, Zahi, Barry, Phil, Kathy, Clare, Tony, Steve(s), Richard, Nick(s), Bill, Simon, Ken, Vuk, Klaus, Tian, Satish, Brad, Katrina, Mark, Joe, John, Andrew, Bill, Michele, Liz, David, Tom, Trevor, Adrian, Xi, Laurent, Josef, Howie, Eric, Lee-Anne, Friedemann, Lisa, Armen, Gordon, Bill, Jing, Jane, Mark, Maude, Ioana, Sima, Tanya, Tony, Dan(s), Oksana, Ling, Joanna, Sean, Eldad, Meagan, Kiko, Megha, Kevin and Jenn. Also thanks to the Canadian Institutes for Health Research as a reason to maintain vigilance and Caroline for her patience with science.

References

1. Cohen, P., Yellowlees, D., Aitken, A., Donella-Deana, A., Hemmings, B.A. and Parker, P.J. (1982) Separation and characterization of glycogen synthase kinase 3, glycogen synthase kinase 4 and glycogen synthase kinase 5 from rabbit skeletal muscle. *Eur. J. Biochem.* **124**, 21-35.
2. Picton, C., Aitken, A., Bilham, T and Cohen, P. (1982) Multisite phosphorylation of glycogen synthase from rabbit skeletal muscle. Organisation of the seven sites in the polypeptide chain. *Eur. J. Biochem.* **124**, 37-45.
3. Parker, P.J., Embi, N., Caudwell, F.B. and Cohen, P. (1982) Glycogen synthase from rabbit skeletal muscle. State of phosphorylation of the seven phosphoserine residues in vivo in the presence and absence of adrenaline. *Eur. J. Biochem.* **124**, 47-55.
4. Parker, P.J., Caudwell, F.B. and Cohen, P. (1983) Glycogen synthase from rabbit skeletal muscle; effect of insulin on the state of phosphorylation of the seven phosphoserine residues in vivo. *Eur. J. Biochem.* **130**, 227-234.
5. Woodgett, J.R. and Cohen, P. (1984) Multisite phosphorylation of glycogen synthase. Molecular basis for the substrate specificity of glycogen synthase kinase-3 and casein kinase-II (glycogen synthase kinase-5). *Biochim. Biophys. Acta* **788**, 339-347.
6. Woodgett, J.R. and Hunter, T. (1987) Immunological evidence for two distinct forms of protein kinase C. *Mol. Cell. Biol.* **7**, 85-96.
7. Boyle, W.B., Smeal, T., Defize, L.H. K., Angel, P., Woodgett, J.R., Karin, M., and Hunter, T. (1991) Activation of protein kinase C decreases phosphorylation of cJun at sites that negatively regulate its DNA binding activity. *Cell* **64**, 573-584.
8. Woodgett, J.R. (1990) Molecular cloning and expression of glycogen synthase kinase-3/Factor A. *EMBO J.* **9**, 2431-2438.

9. Siegfried, E., Perkins, L.A., Capaci, T.M. and Perrimon, N. (1990) Putative protein kinase product of the *Drosophila* segment-polarity gene *zeste-white3*. *Nature* **345**, 825-829.
10. Bourouis, M., Moore, P., Ruel, L., Grau, Y., Heitzler, P. and Simpson, P. (1990) An early embryonic product of the gene *shaggy* encodes a serine/threonine protein kinase related to the CDC28/cdc2+ subfamily. *EMBO J.* **9**, 2877-2884.
11. Cross, D.A., Alessi, D.R., Cohen, P., Andjelkovich, M. and Hemmings, B.A. (1995) Inhibition of glycogen synthase kinase-3 by insulin mediated by protein kinase B. *Nature* **378**, 785-789.
12. Bianchi, M.W., Plyte, S.E., Kreis, M. and Woodgett, J.R. (1993) A *Saccharomyces cerevisiae* protein-serine kinase related to mammalian glycogen synthase kinase-3 and *Drosophila melanogaster* *shaggy* genes. *Gene* **134**, 51-56.
13. Plyte, S.E., Feokstiva, A., Burke, J.D., Woodgett, J.R. and Gould, K.L. (1996) *Schizosaccharomyces pombe* *skp1+* encodes a protein kinase related to mammalian glycogen synthase kinase-3 and complements the *cdc14* cytokinesis mutant. *Mol. Cell. Biol.* **16**, 179-191.
14. Bianchi, M.W., Guivarc'h, D., Thomas, M., Woodgett, J.R. and Kreis, M. (1994) *Arabidopsis* homologs of the *shaggy* and GSK-3 protein kinases: molecular cloning and functional expression in *Escherichia coli*. *Mol. Gen. Genet.* **242**, 337-345.
15. Alon, L.T., Pietrokovski, S., Barkan, S., Avrahami, L., Kaidanovich-Beilin, O., Woodgett, J.R., Barnea, A. and Eldar-Finkelman, H. (2011) Selective loss of glycogen synthase kinase-3 α in birds reveals distinct roles for GSK-3 enzymes in tau phosphorylation. *FEBS Lett.* **585**, 1158-1162.
16. Hoefflich, K.P., Luo, J., Rubie, E.A., Tsao, M.-S., Jin, O. and Woodgett, J.R. (2000) Requirement for glycogen synthase kinase-3 β in cell survival and NF- κ B activation. *Nature* **406**, 86-90.
17. Harwood, A.J., Plyte, S. E., Woodgett, J., Strutt, H. and Kay, R.R. (1995) Glycogen synthase kinase 3 (GSK-3) regulates cell fate in *Dictyostelium*. *Cell*, **80**, 139-148.
18. Klein, P.S. And Melton, D.A. (1996) A molecular mechanism for the effect of lithium on development. *Proc. Natl. Acad. Sci. USA* **93**, 8455-8459.
19. O' Brien, W.T., DeAra Harper, A., Jové, F., Woodgett, J.R., Maretto, S., Piccolo, S., Fuchs, E. and Klein, P.S. (2004) Glycogen synthase kinase-3 β haploinsufficiency mimics the behavioral and molecular effects of lithium. *J. Neurosci.* **24**, 6791-6798.
20. Doble, B., Patel, S., Wood, G.A., Kockeritz, L.K. and Woodgett, J.R. (2007) Functional redundancy of GSK-3 α and β in Wnt/ β -catenin signaling in an allelic series of embryonic stem cell lines. *Dev. Cell* **12**, 957-971.
21. Ying, Q.-L., Wray, J., Nichols, J., Silva, J., Battle-Morera, L., Doble, B., Woodgett, J., Cohen, P. and Smith, A. (2008) The ground state of embryonic stem cell self-renewal. *Nature* **453**, 519-523.
22. MacAulay, K., Doble, B.W., Patel, S., Hansotia, T., Sinclair, E.M., Drucker, D.J., Nagy, A. and Woodgett, J.R. (2007) Glycogen synthase kinase-3 α -specific regulation of hepatic glycogen metabolism. *Cell Metab.* **6**, 329-337.
23. Tanabe, K., Liu, Z., Patel, S., Doble, B.W., Li, L., Cras-Méneur, C., West, S.M., Welling, C.M., White, M.F., Bernal-Mizrachi, E., Woodgett, J.R. and Permutt, M.A. (2008) Genetic deficiency of glycogen synthase kinase-3 β corrects diabetes in mouse models of insulin resistance. *PLoS Biology* **6**, e37.
24. Patel, S., Doble, B.W., MacAulay, K., Sinclair, E.M., Drucker, D.J. and Woodgett, J.R. (2008) Tissue-specific role of glycogen synthase kinase-3 β in insulin action. *Mol. Cell. Biol.* **28**, 6314-6328.
25. Kerkela, R., Kockeritz, L., MacAulay, K., Zhou, J., Doble, B.W., Beahm, C., Greytak, S., Woulfe, K., Trivedi, C.M., Woodgett, J.R., Epstein, J.A., Force, T. and Huggins, G.S. (2008) Glycogen synthase kinase-3 β (GSK-3 β) but not GSK-3 α is necessary for heart development. *J. Clin. Invest.* **118**, 3609-3618.
26. Kim, W.-Y., Wang, X., Wu, Y., Doble, B., Patel, S., Woodgett, J.R. and Snider, W. (2009) GSK-3 is a master regulator of neural progenitor homeostasis. *Nature Neurosci.* **12**, 1390-1397.
27. Kaidanovich-Beilin, O., Lipina, T.V., Keizo, T., van Eede, M., Satoko, H., Laliberté, C., Khan, M., Okamoto, K., Chambers, J., Flether, P., MacAulay, K., Doble, B., Henkelman, R.M., Miyakawa, T., Roder, J. and Woodgett, J.R. (2009) Abnormalities in brain structure and behavior in GSK-3 α mutant mice. *Molecular Brain* **2**, 35.
28. Zhou, J., Freeman, T.A., Ahmad, F., Shang, X., Mangano, E., Gao, E., Farber, J., Wang, Y., Ma, X.L., Woodgett, J., Vagnozzi, R.J., Lal, H. and Force, T. (2013) GSK-3 α is a central regulator of age-related pathologies in mice. *J. Clin. Invest.* **123**, 1821-1832.
29. Dembowy, J., Adissu, H.A., Liu, J.C., Zacksenhaus, E. and Woodgett, J.R. (2015) Effect of glycogen synthase kinase-3 inactivation on mouse mammary gland development and oncogenesis. *Oncogene* **34**, 3514-3526.
30. Jellusova, J., Cato, M.H., Apgar, J.R., Ramezani-Rad, P., Leung, C.R., Chen, C., Richardson, A.D., Conner, E.M., Benschop, R.J., Woodgett, J.R. and Rickert, R.C. (2017) GSK3 is a metabolic checkpoint regulator in B cells. *Nature Immunol.* **18**, 303-312.
31. Hurcombe, J.A., Hartley, P., Lay, A., Ni, L., Singh, S., Murphy, A., Scudamore, C.L., Marquez, E., Barrington, A.F., Pinto, V., Marchetti, M., Wong, L.-F., Uney, J., Saleem, M.A., Mathieson, P.W., Patel, S., Walker, R.J., Woodgett, J.R., Quaggin, S.E., Welsh, G.I. and Coward, R.J. (2019) Podocyte glycogen synthase kinase 3 is an evolutionarily conserved master regulator of kidney function. *Nature Commun.* **10**, 403.

News from Member Departments

Dalhousie University

Department of Biochemistry and Molecular Biology

Correspondent: Stephen L. Bearne

The 2018-19 academic year was the year that Dalhousie University celebrated its 200th anniversary and the medical school turned 150 years old. Many special events were held to celebrate these two milestones, including the Department of Biochemistry and Molecular Biology launching its Macpherson Seminar Series to recognize graduates of the department who have distinguished themselves in their careers since leaving Dalhousie. The lecture series is named in honour of Dr. Lloyd B. Macpherson, a previous member of the department and Dean of the Faculty of Medicine at Dalhousie University. It was a pleasure to welcome back **Dr. David Edgell** (Acting Chair, Department of Biochemistry, Western University, Ph.D. Dalhousie 1997, under the supervision of **Ford Doolittle**) and **Dr. David Breckenridge** (Senior Director of Biology, Gilead Sciences, Inc., B.Sc. Dalhousie 1998, and son of **Carl Breckenridge**, previous Head of the Department) to kick off the seminar series.



Dean David Anderson presents Dr. David Edgell and Dr. David Breckenridge with plaques recognizing their participation as Macpherson Seminar Series Speakers during the 150th Anniversary of Dalhousie Medical School. (Photo courtesy of Heidi MacKinnon.)

In March, 2018, Jan Rainey hosted Dr. Lewis Kay (University of Toronto, noted for his development of NMR spectroscopy methods for the study of large molecular machines and previously invisible states of proteins) who, as the 2017 Dalhousie Medical Research Foundation/Gairdner Lecturer, delivered a comprehensive seminar to a packed auditorium, as well as a lecture to ~100 students at Citadel High School. **Ford Doolittle** was awarded an

honorary degree from the University of Kings College on May 31, 2018. A retirement party was held for **David Byers** and **Carmichael Wallace**. We wish both David and Carmichael all the best in their retirement. In addition, **David Byers** received the Department's first Excellence in Teaching Award at the Department's convocation reception held on June 1, 2018. Students will miss his use of vivid analogies for teaching various aspects of metabolism and thermodynamics that invariably involved mentioning the Habs and the Leafs!



Ford Doolittle receives an honorary degree from the University of Kings College on May 31, 2018. (Photo courtesy of John Archibald.)



David Byers (L) and Carmichael Wallace (R) open their gifts from the department at their retirement party. (Photo courtesy of Heidi MacKinnon.)



Stephen Bearne (R) presents the department's first Excellence in Teaching Award to David Byers (L). (Photo courtesy of Heidi MacKinnon.)

Shannon Sibbald, a graduate student with John Archibald, worked with other graduate students and post-doctoral fellows to organize a successful student research day that featured poster presentations, 3-minute thesis presentations, a popular science writing workshop, and a seminar by Dr. David Smith (Department of Biology, Western University).



Graduate students at the Student Research Day with the invited speaker, Dr. David Smith. (Photo courtesy of Heidi MacKinnon.)

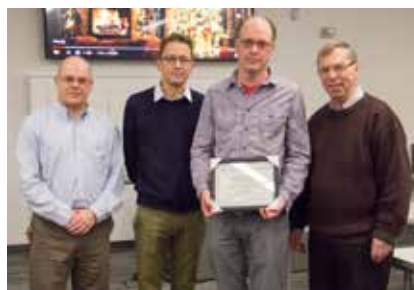
The Department continued to celebrate the successes of its students, post-doctoral fellows, and research associates during the past year. **Kyungsoo Shin**, a graduate student with Jan Rainey, was awarded the Patrick Prize for best Ph.D. thesis. **Dr. Sophie de Vries**, a post-doctoral fellow with Claudio Slamovits, and **Calem Kenward**, a graduate student with David Langelaan, both received Beth Gourley Conference Awards, which were kindly established by **Catherine Lazier** and her husband John Lazier. **Sergio Muñoz-Gómez**, a graduate student with Claudio Slamovits and Andrew Roger, received the Doug Hogue Award, recognizing “exceptional dedication and achievement in research and intradepartmental student activity”. Finally, **Bruce Curtis**, a research associate with John Archibald, received the 2017 Schnare-Spencer Prize, which was established by **Mike Gray** in honour of two long-time research associates in his lab.



Dr. Catherine Lazier presents the Beth Gourley Conference Award to Calem Kenward (M.Sc. student). (Photo courtesy of Heidi MacKinnon.)



Sergio Muñoz-Gómez received the Doug Hogue Award and is pictured with his supervisors Claudio Slamovits (L) and Andrew Roger (R). (Photo courtesy of Heidi MacKinnon.)



Bruce Curtis, recipient of the Schnare-Spencer Award, with Stephen Bearne, John Archibald, and Mike Gray (L to R). (Photo courtesy of Heidi MacKinnon.)

Our alumni (and anyone else interested) are invited to find out about the latest news and events of the Department of Biochemistry and Molecular Biology at www.biochem.dal.ca.

McGill University

Department of Biochemistry

Correspondent: Martin Schmeing (with Maxime Denis, Jason Young, Marlene Gilhooly and with photos from Christine Laberge)

As always, 2018 was a busy year for the Department of Biochemistry at McGill University. Exciting research and teaching continue to drive the department’s activities.

Faculty news:

The department recruited **William Pastor** (previously a post-doctoral fellow with Steven Jacobsen, UCLA) and **Lawrence Kazak** (previously a post-doctoral fellow with Bruce Spiegelman, Harvard) as Assistant Professors. Biochemistry faculty members **Bhushan Nagar** and **Josée Dostie** were promoted to the rank of Full Professor, and **Philippe Gros** was appointed Deputy Vice-Principal (Research and Innovation). Sadly, Professor Emeritus **Gordon Shore** died in 2018. In tribute to this wonderful friend and colleague, the Gordon Shore Prize for theses in life sciences was created by CQDM, Diazon Pharmaceuticals, the Oncopole, and Mitacs.

Research news:

Notable breakthroughs published this year include: A study led by **Kalle Gehring** showed that mutations in the ubiquitin ligase parkin are responsible for a familial form of Parkinson’s disease. Crystallography and hydrogen-deuterium exchange experiments revealed the large-scale conformational changes upon parkin activation by the kinase PINK1. (Nature Structural and Molecular Biology, 25, 623–630). **Philippe Gros** and **Jerry Pelletier** collaborated to discover a novel class of natural products (rocaglates) with robust anti-malarial activity.

These molecules show anti-inflammatory activity as well, and may be of potential novel use in cerebral malaria where the pathology is driven by the inflammatory response of the host (Proc Natl Acad Sci USA, 115 (10) E2366-E2375). The lead author of the study is **David Langlais**, who has just moved from the Gros lab to start his own venture in Human Genetics at McGill. **Lawrence Kazak** got his lab started with a splash by demonstrating that creatine transport into adipocytes protects mice from obesity. They showed that in response to caloric excess, wild-type mice increase their energy expenditure to limit obesity, but mice with fat-specific ablation of the creatine transporter cannot activate energy expenditure in response to caloric excess, and therefore become obese (Nature Metabolism 1, 360–370). **Martin Schmeing** (in collaboration with Jason Chin (Cambridge) and Chris Boddy (Ottawa)), developed and introduced a new orthogonal amino acid into a synthetase to visualize a series of intermediates in the non-ribosomal peptide synthesis of daptomycin. The structures showed that a mobile element in the synthetase was in vastly different conformations when an intermediate bound to the enzyme was to be oligomerized or cyclized (Nature, 565,112-117). A recent paper published by **Michel Tremblay's** research group describes a remarkable post-transcriptional feedback mechanism of the PRL phosphatases, a group of protein tyrosine phosphatases involved in magnesium transport. An evolutionarily conserved magnesium-sensitive uORF was identified in PRL mRNA, which allows PRL to regulate intracellular magnesium levels and consequently modulate cellular bioenergetics in mammalian cells (Proc Natl Acad Sci USA, 116, 2925-2934).

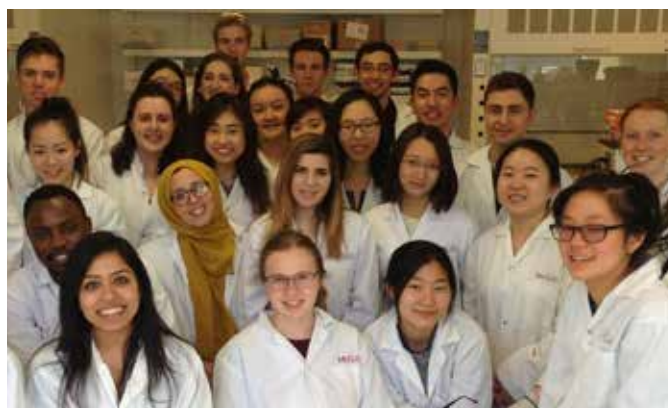
Honours and awards:

These and other research successes were recognized by honours including Distinguished James McGill Professorships to **Albert Berghuis**, **Erwin Schurr** and **Michel Tremblay**, a spot in the Top 10 Discoveries of 2018 in Quebec for **Philippe Gros** and **Jerry Pelletier**, a Tier I CRC for **Alba Guarné**, a Tier II CRC renewal for **Sid Huang**, a Friends of CIHR Award of Honour to **Rod McInnes**, a Prix du Quebec to **Nahum Sonenberg**, and a Cystic Fibrosis Canada Cathleen Morrison Research Impact Award to **David Thomas**.

Teaching news:

Our undergraduate teaching program underwent important improvements and innovations in 2018. First,

the teaching approach in our lab course BIOC 220 was reviewed, and students now learn through a stepwise process how to write their lab report. Hence, to the survey question “how well do you think BIOC 220 has performed in delivering its learning objectives?” 70% of students answered “very well” in 2018 compared to 19% in 2017. In its most recent version, BIOC 220 is more enjoyable and better helps students to acquire lab report writing skills. The task force who worked hard to improve the course, by including good evaluation practice, writing guidelines and tutorials, can be proud of this accomplishment. In collaboration with McGill Teaching and Learning Services, the department held a series of workshops on efficient teaching in biochemistry in June 2018. Twenty people from 5 departments in Biomedical Sciences learned about the learning process, competency-based learning and active learning. Several undergraduate courses were modified based on these workshops, and they also helped many of our lecturers hone their skills, including co-awardees of a new annual teaching award, **Uri David Akavia** and **Vicky Kottis**.



Experience McGill Biochemistry!

The Biochemistry graduate program continued to do well in 2018. Our numbers are stable; in Fall 2018 we had 115 students, with 18 new admissions. Of our total students, 50 were masters students and 65 were doctoral students; 54 were Canadian and 61 international. There were 62 female and 53 male students. Thus, we have a diverse and well-balanced student body which is the heart of the department. The Masters and Doctoral programs proceeded smoothly. Seminar attendance policies were firmly established for graduate students, as well as a system for streaming of seminars off-campus. Our graduate and post-doctoral trainees continue to excel, publishing many first-author papers, and winning scholarships and presentation awards.



McGill Biochemistry Ph.D. graduates 2018

McMaster University

Department of Biochemistry and Biomedical Sciences

Correspondent: John Whitney

Faculty and research news:

This past year was highlighted by many outstanding discoveries by members of our department (BBS). The majority of our faculty are associated with one of three major research institutes at McMaster. Members of the Michael DeGroote Institute for Infectious Disease Research (IIDR) made many seminal contributions in the fields of infectious disease and antimicrobial resistance. **Eric Brown** and **Brian Coombes** identified a compound that selectively inhibits the growth of *Salmonella* within macrophages (*Nature Comm*, 10:197). Using comparative RNA sequencing **Brian Coombes'** lab also characterized the virulence regulon of *Salmonella* (*Cell Reports*, 25:825). Furthermore, his lab uncovered important insights into the mechanisms of gut adaptation by the Crohn's disease-associated bacterium adherent-invasive *Escherichia coli* (*Cell Host & Microbe*, 25:301). Members of **John Whitney's** group teamed up with the lab of Stefan Raunser to uncover the mechanism of toxin translocation by the bacterial type VI secretion system (*Nature Microbiol*, 3:1142). Faculty in our Stem Cell and Cancer Research Institute (SCC-RI) also made many significant contributions to their field. **Mick Bhatia** discovered that a subset of founder cells is critical for the development of pluripotent stem cells (*Cell*, 177:910). His group also identified leukemic-regenerating cells (LRCs) as the responsible cell type for acute myeloid leukemia recurrence (*Cancer Cell*, 34:483). **Karun Singh** and his team published a study showing that the OTUD7A gene plays a critical role in 15q13.3 microdeletion syndrome

(*Am J Hum Genet*, 102:278). **Ray Truant's** group identified a small molecule that was protective in Huntington's disease model neurons (*PNAS*, 115:7081).

Our Farncombe Family Digestive Health Research Institute celebrated its 10th anniversary this past November. The Farncombe Institute is a highly interdisciplinary group of scientists from many different departments that focus on gastrointestinal research. Over the past year, this group has made many impactful discoveries, including a study published by BBS faculty member **Jonathan Schertzer**, who discovered that long term exposure to obesity-related microbiota promotes host insulin resistance (*Nature Comm*, 9:4681).



The McMaster Farncombe Family Digestive Health Research Institute celebrated its 10th anniversary this past November. Shown are Farncombe executive members (left to right) Dr. Michael Surette, Dr. Stephen Collins, Dr. Elena Verdu and Dr. Paul Moayyedi.

The Canadian national media continue to approach BBS faculty members to relay important scientific information to the public. For example, **Gerry Wright** was featured on *CBC Marketplace* to discuss the rise of antibiotic-resistant bacteria found in imported shrimp being sold in grocery stores across Canada. Gerry also discussed the rise of antibiotic-resistant bacteria in healthcare settings in an article published by the *National Post*.



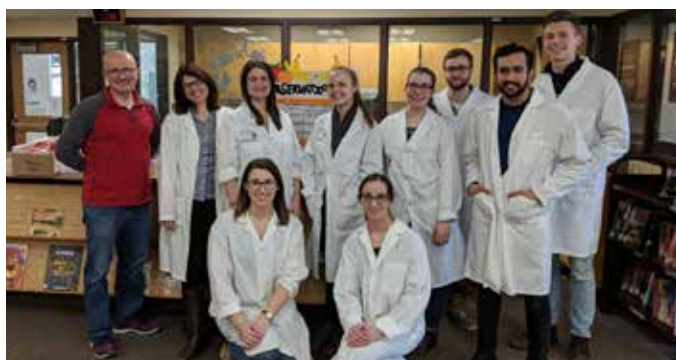
McMaster BBS in the media. Dr. Gerry Wright was interviewed by the *National Post* and *CBC Marketplace* about the growing concern of antibiotic-resistant bacteria.

BBS faculty continued to achieve high success rates in research funding competitions and faculty awards. In the 2018 CIHR Project Grant competitions, funding was awarded to **Dino Trigatti**. 2018 NSERC Discovery Grant Recipients included **Eric Brown** and **Karun Singh**, while **Giuseppe Melacini** was awarded an NSERC Infrastructure Award for a much-needed SEC-MALS instrument. **Eric Brown** was successful in his CFI application entitled “Good Bugs, Bad Bugs”, which will allow BBS faculty who specialize in microbiology to continue to carry out their impactful research addressing the ever-increasing problem of antimicrobial resistance. Notable faculty awards included a 2018 YWCA Woman of Distinction nomination to **Felicia Vulcu**. **Mike Surette** was elected as a Fellow of the American Academy of Microbiology, an exclusive group comprising the world’s most accomplished microbiologists, and **Karun Singh** was awarded a New Investigator Award from the Canadian Association for Neurosciences.



43rd Annual YWCA Women of Distinction Awards Ceremony. Dr. Felicia Vulcu (third from left) celebrates her nomination with BBS Ph.D. students Bushra Ilyas (left) and Celeste Stuart (third from right) and BBS faculty members Dr. Lori Burrows (second from left), Dr. Lesley MacNeil (second from right) and Dr. Sara Andres (right).

Science outreach continues to be an important activity carried out by the members of our department. This year, BBS faculty member **Dawn Bowdish** and members of Gerry Wright’s lab visited Dundas Central Elementary School to share the excitement of scientific discovery.



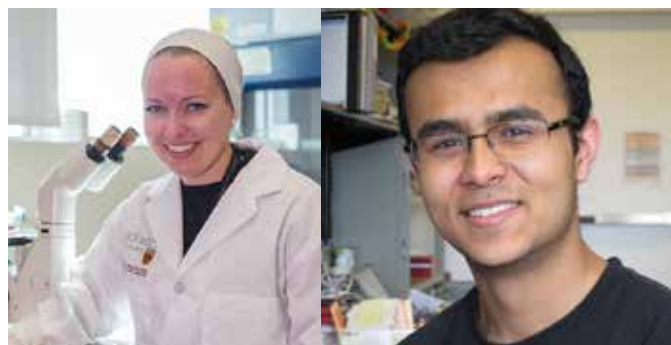
McMaster BBS outreach. Dr. Dawn Bowdish (second from left) and members of Gerry Wright’s lab at Dundas Central Elementary School.

Graduate program:

This past fall we welcomed our incoming cohort of graduate students, which consisted of 22 M.Sc., 8 Ph.D. and one M.D./Ph.D. candidates. Graduate students in our department continue to obtain scholarships at a high rate, with 16 major external scholarships being awarded in 2018. Among these award winners were Ph.D. students **Alyssa Vito** from Karen Mossman’s lab and **Saad Syed** from Mike Surette’s lab, who were awarded highly competitive Vanier Canada Graduate Scholarships. Additionally, **Dr. Erin McConnell** from Yingfu Li’s Lab was awarded a L’Oréal-UNESCO Women in Science Excellence in Research Fellowship.



Biochemistry new student welcome BBQ 2018. Students of the incoming graduate class of 2018 were welcomed to our department by faculty and staff.



Biochemistry students awarded Vanier Graduate Scholarships. Ph.D. students Alyssa Vito (left) from Karen Mossman’s lab and Saad Syed (right) from Mike Surette’s lab were awarded prestigious Vanier Scholarships to support their Ph.D. research.

The Karl Freeman awards, given out to students who were deemed to have given the best presentations in our graduate student seminar series were awarded to **Alexander Oberc** (1st place, Coombes lab) and **Jennifer Reid** (2nd place, Bhatia Lab) in the Ph.D. category, and **Kara Tsang** (1st place, McArthur Lab) and **Piyanka Sivarajah** (2nd place, Lu Lab) in the M.Sc. category. At our Institute of Infectious Disease Research Annual Trainee Day, **Puja Bagri** (Ph.D., Kaushic Lab), **Kara Tsang** (M.Sc., McArthur Lab), and **Peter Zeng** (undergraduate, Miller Lab) were awarded Michael Kamin Hart Memorial Scholarships. These awards are made possible by the generous support of the Hart family.

Social events:

In keeping with the “work hard, play hard” culture of our department we had a record turnout for the Biochemistry Olympics, which are held during the annual BBS departmental picnic. In this lab-themed pentathlon, teams compete at events that reward both textbook knowledge and manual dexterity - two essential skills of a successful scientist. In the face of stiff competition, the gold medal went to the Wright Lab, followed by silver to the Brown Lab and bronze to the Sloboda Lab. Our annual Halloween party was also very well attended by faculty, staff and students. The creativity of our faculty and students was on full display as highlighted by the Wright lab, who dressed up as the X-men, and the Li and Andres labs, who teamed up to create a Magic School Bus group costume.



Annual BBS Halloween contest. Gerry Wright and his lab dress up as the X-men (top) while Sara Andres and Yingfu Li's labs team up to bring the Magic School Bus to life (bottom).



Annual BBS picnic. Biochemistry students participate in our annual Biochemistry Olympics held during our departmental summer picnic.

Memorial University of Newfoundland

Department of Biochemistry

Correspondent: Mark Berry

The on-going renewal of the Memorial University Biochemistry department and programmes continued in 2018. On the teaching front the biggest change to the undergraduate offerings was the removal of laboratory components from our courses, with these lecture + lab courses now switching to dedicated lecture courses and the creation of three dedicated laboratory courses. The first offering of the second year laboratory course was completed in the Fall 2018 semester, and was successful beyond all expectations. The two third year laboratory courses will get their debuts in the 2019/20 academic year. At the graduate level, two new mandatory courses, a seminar course and a graduate skills course, were introduced to assist students with acclimatizing to the different demands

and expectations of graduate school, and to also promote scientific literacy and inter-disciplinary approaches.

2018 was another successful year for our students, with 5 successful M.Sc. defences and 5 successful Ph.D. defences. Graduate students also received awards from the Beatrice Hunter Cancer Research Training Programme, Canadian Institute of Food Science and Technology, International Society for Nutraceuticals and Functional Foods (ISNFF), and International Division of the Institute of Food Technologists. At the undergraduate level, the department's annual summer symposium, now in its 8th year, continues to go from strength-to-strength, with a record attendance in excess of 80. This year's keynote presentation at the symposium was our first international speaker, Dr. Mark D. Turner, from Nottingham Trent University in the UK.

At the faculty level **Dr. Fereidoon Shahidi** was elected as a Fellow of ISNFF for his long-standing contributions and services to nutraceutical and functional foods research. **Drs. Rob Brown and Fereidoon Shahidi**, in collaboration with Dr. Chris Parrish (Ocean Sciences), received a CFI-JELF award for a new tandem mass spectrometer. **Dr. Sukhinder Cheema** received funding from the Nutrition Obesity Research Center at Harvard University. **Dr. Sherri Christian** received a research grant from the Cancer Research Society, and **Drs. Rob Brown, Valerie Booth, and Mark Berry** were all successful in the NSERC Discovery grant competition. We welcomed **Dr. Scott Harding** as our newest faculty member. Scott, a native Newfoundlander, and graduate of our department, previously held a faculty appointment at King's College in London, England. We also completed a successful search for an Enzyme/Receptor Biochemist faculty position, with the selected candidate due to start in June 2019.

Most notably we had to bid a fond (but sad) farewell to **Dr. John (Sean) Brosnan**, who retired after 47 years of distinguished and internationally renowned service to not only the department, but the wider Memorial University community. Sean, who was born in Ireland, received his B.Sc. at University College, Cork, before completing a Ph.D. at Oxford University under the supervision of Dr. Hans Krebs. Remarkably, he has been continuously funded by MRC/CIHR for the entirety of his 47 years at MUN. Sean's achievements are far too numerous to list here, in keeping with his world renowned status, but a few highlights include election to the Royal Society of Canada in 2009, receiving the Danone Institute of Canada Distinguished Nutrition Leadership Award (jointly with his wife Margaret)

in 2012, and receiving the John Lewis Paton Distinguished University Professorship, the highest faculty award at MUN, in 2014, amongst many other national and international recognitions. In keeping with his unparalleled services, Sean established an endowment fund to create a new named lecture series - the Brosnan Lecture in Biochemistry - as a parting gift to the Department. Sean is going to be sorely missed, although we expect to still see him around once the formalities of emeritus status are confirmed, and we wish him the very best for a long, enjoyable and well deserved retirement.

We have also bid a fond farewell to a number of incredibly dedicated and talented staff who retired during 2018. **Betty Ann Gaslard** and **Christine Squire**, the faces of our front office, retired during the summer. **Craig Skinner**, our laboratory manager and IT specialist, retired in April. All three had in excess of 30 years of service to MUN and are going to be sorely missed. Replacing them will be incredibly difficult, but we were delighted to welcome **Shannon Hayes** and **Kaitlyn Connolly** to the front office, and **Heather Fifield** as our "new Craig".

All-in-all another busy and successful year, that is expected to continue apace in 2019. As more retirements take effect and new position searches commence, the graduate programme is expected to continue to grow, the undergraduate programme continues to be modernized, and building of the new Core Sciences Complex, the department's future home, continues.

Princess Margaret Cancer Centre, Toronto

Correspondent: Gil Privé

It has been a notable year for research at Princess Margaret (PM) Cancer Centre. After several years under the direction of interim Research Directors **Rama Khokha** (2016/17) and **Mitsu Ikura** (2017/2018), **Aaron Schimmer** has been appointed as the new Director of Research at the PM. Aaron has articulated a fresh and ambitious plan for the next phase of the Institute, with an emphasis on transparency and inclusion. One of his early initiatives has been to reorganize the Institute into seven programs: Cancer Biology and Imaging, Computational Biology and Medicine, Genetics and Epigenetics, Immuno-Oncology, Protein Structure and Function, Stem Cells, and Supportive Care.



Dr. Aaron Schimmer

The Institute has been active in recruiting new faculty, with the arrival of **Shane Harding**, who studies the interplay between DNA damage, genome stability, and cancer, **Mohammad Mazhab-Jafari**, a structural biologist who will establish cryo-electron microscopy at the PM, and **Phedias Diamandis**, a neuropathologist with an interest in chemical biology and molecular diagnostics.

Using a wide range of techniques, the team determined that the MYC box II region interacts directly with the G9a histone methyltransferase, thus establishing the epigenetic mechanism responsible for MYC transcriptional repression.

Aaron Schimmer published work in *Cancer Stem Cell* showing that tafazzin (TAZ), a mitochondrial cardiolipin transacylase, is required for the growth and viability of acute myeloid leukemia cells. This discovery opens the door to novel therapeutic strategies for the treatment of AML by manipulating phospholipid metabolism with small molecule inhibitors.

Awards and honours:

Some of the highlights of awards given to PM faculty in the past year include:

Tak Mak, the Gold Leaf Prize for Discovery from the Canadian Institutes of Health Research (CIHR). Tak also received the 11th Annual Weinman Award and Distinguished Affiliated Professor, Technical University of Munich. **Pam Ohashi**, The 2018 Robert L. Noble Prize from the Canadian Cancer Society Research Institute, **Rodger Tiedemann** and **Gelareh Zadeh**, the 2018 William E. Rawls Prize from the Canadian Cancer Society Research Institute, **Trevor Pugh**, the 2018 Stand Up To Cancer Phillip A. Sharp Innovation in Collaboration Award, and **Avi Chakrabarty** the Sanofi iAward for his project on the development of therapeutic antibodies for combating immunoglobulin light chain amyloidosis.



Dr. Rama Khokha



Dr. Trevor Pugh

Research highlights:

Daniel De Carvalho led a team that developed a method to measure disease-related changes in the methylomes of circulating cell-free DNA from cancer patients. This advance, published in *Nature*, opens up the potential for minimally invasive liquid biopsies from plasma for the detection of early stage cancers. This work has been recognized as one the Top 10 Cancer Research Publications by the European Association for Cancer Research.

In work published in *Cancer Cell*, **Linda Penn** and collaborators from the PM have discovered the missing link between the MYC oncoprotein and gene repression.



Dr. Tak Mak



Dr. Pam Ohashi



Dr. Rodger Teidemann Dr. Galareh Zadeh Dr. Avi Chakrabarty

Ryerson University

Department of Chemistry and Biology

Correspondent: Roberto Botelho

The Department of Chemistry and Biology encompasses multi-disciplinary interests in research and education and is home to almost 40 faculty. Our Chemistry research programs are generally focussed on macromolecular, synthetic and medicinal chemistry. The research interests in Biology enjoy strengths ranging from biochemistry, molecular and cell biology, to genetics, microbiology and environmental biology. The breadth and variety of research interests creates an exceptional environment that permits cross-pollination of ideas and an open-concept milieu for learning and teaching. We are also the home department for the Molecular Science Graduate Program, which now hosts over 50 graduate students in the Ph.D. and M.Sc. programs.

New faculty:

In 2018, our department recruited **Dr. Michael Olson** from the Cancer Research U.K. Beatson Institute and the University of Glasgow, U.K., as a Tier I Canada Research Chair. Dr. Olson's research seeks to identify and understand the characteristics of cancer cells that are prone to migrate from their primary sites to secondary sites. With over 100 publications and numerous invited talks, Dr. Olson is an internationally-recognized cell biologist, having made significant contributions to our understanding of how our cells modulate their actin cytoskeleton to enable cancer cell migration, invasion and metastasis. He is the Editor-in-chief of the journal *Small GTPases* and on the editorial board of additional journals. Since starting at Ryerson, he has published several works on the regulation and function of MRCK kinases, which

are downstream effectors of the CDC42 GTPase, as well as the identification and characterization of MRCK and ROCK inhibitors that are being developed further with the goal of reducing the spread of cancer cells, as reported in Unbekandt *et al.*, 2019, Unbekandt *et al.*, 2018, Rath *et al.*, 2018, and Birch *et al.*, 2018.



Dr. Michael Olson

Dr. Imogen Coe ends her tenure as first Dean of Science:

On a broader level, 2018 represented the end of the term of the founding dean of the Faculty of Science at Ryerson University. **Dr. Imogen R. Coe**, a biomedical research scientist, long-time member of CSMB and its current Vice President, was recruited from York University in 2012 to become the founding dean of the new Faculty of Science, which was "liberated" from the former Faculty of Engineering, Architecture and Science. Over the six years of her term, Dr. Coe worked with faculty, staff and community members to achieve an identity for the new faculty which was built around Connected Science - reflecting the strong sense of support and interest that students reported feeling about their experience with the programs and their professors, the strong sense connection to many community partners (such as hospitals, businesses, industry, government), and the essential "connectedness" that is (and must be) 21st century science when complex problems, whether in health or environment, require interdisciplinary research. Since being established, the Faculty of Science became the first at Ryerson to offer graduate programs at the masters and doctoral levels across all disciplines within the faculty, and research output increased significantly from 2012 to 2017. Achievements of the first five years of the new faculty can be found in the awarding winning anniversary book (see <http://www.nxtbook.com/dawson/ryersonfs/5thanniversary/index.php>) Ever the enthusiastic advocate for research, Dr. Coe invested heavily in new programs to support research infrastructure and trainees (launching programs to fund post-docs, international student exchanges and bring in research grant writers and project managers to help with proposals). She also worked with the administration to secure net new space for research for various disciplines including state-of-the-art new biomedical science laboratory space at MaRS, which allowed new hires and early career researchers to establish research programs with good infrastructure support. Productive partnerships with the biomedical community in Toronto and beyond were established and strengthened, notably with the research community of clinicians, biomedical engineers and medical physicists based at iBEST within St. Michael's Hospital (where Dr. Coe's research group finally relocated more than two years after she took the position) and at Sunnybrook Hospital. Despite heavy administrative demands as a founding dean, Dr. Coe successfully renewed an NSERC Discovery Grant in 2017 and continues to be an active researcher (e.g. Guo et al.

2019 Nature Chemistry and Grañe-Boladeras et al. 2019 FASEB J). She also provides leadership nationally and internationally with regard to embedding equity, diversity and inclusion in the research landscape in Canada (e.g. Coe



Dr. Imogen Coe

et al. 2019 The Lancet). On July 1, 2018, she started a well-earned administrative leave and will return as faculty to the Department of Chemistry and Biology to continue investigating membrane protein function and regulation.

Dr. David Cramb joins as new Dean of Science:

With the departure of Dr. Coe as Dean of Science, we were fortunate to recruit **Dr. David Cramb** as our next Dean of Science from the University of Calgary, where he made significant contributions as a chemist across disciplines. Indeed, if creativity is contagious, then David Cramb's colleagues, partners and students have no doubt caught the bug. Dr. Cramb's commitment to interdisciplinary research, innovative collaborations and new ways of doing just about anything set before him is more than a professional habit – it's a state of mind. A musician, researcher and teacher in both the arts and sciences, one of Cramb's many collaborations is with Jennifer Adams, Canada Research Chair in Creativity and STEM at the University of Calgary. Drs. Cramb and Adams share a passion for developing the creative capacities needed in STEM learners to address the challenges of our world. "Teaching STEM subjects with an emphasis on developing creativity and incorporating other branches of knowledge is a priority of mine," he says.

Providing students with open-ended laboratory experiences, where the outcomes are not predetermined, is also a priority. "Students learn best by doing and become better scientists through hands-on experiences. They should be generating and testing hypotheses every day," he says. In a career that has emphasized teaching and learning as much as original research, Dr. Cramb has provided that experience in over a dozen chemistry and nanoscience courses. He has also collaborated with colleagues in other faculties to offer courses that merge literature, history, science and music.

In his own research, Dr. Cramb is focussing on the behaviour of nanoparticles for biomedical applications.



Dr. David Cramb

Specifically, he is interested in the use of nanomaterials for more effective diagnosis and treatment of disease, especially cancer. "Looking ahead, one of the potential benefits of this research is the diagnosis of early-stage cancer, potentially through the application of smart toilets that analyze urine samples."

Awards and publications:

Our researchers have published in *J. Cell Biol.*, *J. Biol. Chem.*, *Cell Chem. Biol.*, *G3*, *J. Cell Sci.*, and *Clinical Proteomics*, among others, with novel discoveries related to lysosome dynamics, metabolic adaptation, phosphoinositide biology, enzymatic engineering, host-pathogen interactions, glycobiology, and biomarkers. This was complemented by awards from NSERC, CIHR, CFI, and CRC to members of our Department.

Special events:

Our department continues to be a key participant in Ryerson's "Science Rendezvous" that ran in May 2018. This was the 11th Science Rendezvous hosted at nearby Yonge-Dundas Square, arguably the busiest intersection in Toronto. Open to the public, it easily attracted several thousand visitors by showcasing research, hands-on activities, displays and stage shows that delighted the audience and demonstrated how science plays a part in our everyday lives.

We also held our second Departmental Retreat on the north shore of Lake Simcoe, where we had the opportunity to plan how to best integrate chemistry into biological research and teaching. This is just one of several efforts that we pursued to foster interdisciplinary research and understanding. Lastly, we hosted our 7th Annual Research Symposium with more than 90 poster presentations and talks. These showcased our exciting research activities across various disciplines and highlighted both undergraduate and graduate-based research activities. Dr. Elizabeth Gilles from Western University was the keynote speaker, who spoke about her ongoing contributions to bring polymer chemistry to drug delivery and tissue engineering.

Simon Fraser University

Department of Molecular Biology and Biochemistry

Correspondent: Christopher Beh

This report for the Molecular Biology and Biochemistry (MBB) Department at SFU highlights a number of accomplishments by our faculty and students, as well as other notable successes in our research and teaching programs. As always, we encourage all our MBB Department alumni to contact us at mbbalumni@sfu.ca so we can hear about your successes since leaving SFU.

Department highlights:

We congratulate **Dr. Fiona Brinkman** on being named to the *Royal Society of Canada* in recognition of her research involving bioinformatics and computational tools for studying infectious and microbial disease. We also congratulate **Dr. David Voadlo** for receiving the *Belleau Award* from the *Canadian Society for Chemistry* in recognition of his work on chemical glycobiology. For exceptional service to the *Biophysical Society of Canada*, **Dr. Jenifer Thewalt** was awarded the 2018 *Michele Auger Service Award*. Dr. Thewalt is an expert on NMR spectroscopy of lipids in model membranes. For these auspicious awards, we commend these award recipients as well as other department faculty, students, and staff who also received honours during the last year.

Faculty retirements and promotions:

During this past year, we also toasted a couple of colleagues upon their retirement for their years of hard work and service to our department. **Dr. Barry Honda** retires after a distinguished career investigating the function of heterochromatin in *D. melanogaster*. **Dr. Rosemary Cornell** retires after a fruitful career studying mechanisms of allosteric regulation of enzymes by membrane binding. Both continue to be forces in our department, and we thank both for their efforts in shaping the current success of our department.

Regarding faculty promotions, **Dr. Christopher Beh** (your SFU CSMB correspondent) was advanced to full Professor. Dr. Beh is a molecular geneticist/cell biologist who works on mechanisms of membrane contact sites and membrane transport in budding yeast. We congratulate **Dr. Ryan Morin** who was promoted to Associate Professor with tenure; he has received great recognition for his use of high-throughput sequencing and bioinformatics to identify driver mutations associated with cancer malignancy.

Student awards and other news:

Congratulations go out to **Dr. Eric Hall** (MBB-GS 2018), who received the coveted *Dean's Convocation Medal* from the Faculty of Science for his Ph.D. thesis research. Dr. Hall worked in Dr. Esther Verheyen's lab identifying novel mechanisms involving *Wnt* signalling in *Drosophila*. Currently Dr. Hall is a post-doctoral fellow at St. Jude Children's Research Hospital in Memphis, Tennessee. For their thesis research, **Drs. Evan Quon** (MBB-GS 2018) and **Sunny Jeng** (MBB-GS 2018) won the *Dr. Brandhorst "Best Publication"* and *"Best MBB Ph.D. Thesis"* awards, respectively. Both are currently interviewing for post-doctoral fellowships. **Katrina Besler** (MBB 2018) was awarded the *Gordon M. Shrum Gold Medal* for her outstanding success as a B.Sc. Hons. student in the MBB Department. Ms. Besler had already started studies in a M.D./Ph.D. program after graduation.

Trent University

Department of Biology and affiliated departments

Correspondent: Carolyn Kapron

In 2018, faculty members from Biology, Psychology, Forensic Science, and Chemistry joined forces to develop the **Molecules, Cells, and Systems Research Group**. Continuing the long tradition of interdisciplinary research at Trent, the group will bring together investigators whose interests focus on areas such as cell and molecular biology, biochemistry, microbiology, developmental biology, physiology, and neuroscience to enhance collaborations and opportunities. The Group's first event, now in the planning stages, will be a research day for graduate students to present their work.

Dr. Sanela Martić has joined Trent as a tenure-track faculty member in the Department of Forensic Science. Dr. Martić was previously a faculty member in the Department of Chemistry at Oakland University (2012-2018). While she was in the USA, Dr. Martić's research was funded by the National Institutes of Health, the American Chemical Society Petroleum Research Fund, the American Heart Association and the Michigan Grant Space Consortium. Dr. Martić received an M.Sc. (2005) in Chemistry from McMaster University under the supervision of Dr. Michael A. Brook. She then joined Queen's University and obtained her Ph.D. (2009) in Chemistry under the supervision of Dr. Suning Wang and co-supervision by Dr. Gang Wu. Dr.



Sanela Martic

Martic carried out her post-doctoral work at Western University and University of Toronto Scarborough with Dr. Heinz-Bernhard Kraatz. The research in Dr. Martic's group is focussed on the molecular investigations of biological and chemical processes, using a variety of bioanalytical and biochemical tools.

Ph.D. candidate **Mark Seegobin** (Environmental and Life Sciences Graduate Program) has uncovered exciting new information about signalling molecules. Working under the supervision of **Dr. Neil Emery** and **Dr. Craig Brunetti** of the Biology Department, Mr. Seegobin has discovered that a range of classical plant hormones, known as cytokinins, are present in mammalian tissues. His findings, first presented at the 2018 Auxin and Cytokinin in Plant Development Conference in Prague, were published



Mark Seegobin

in the December issue of the Federation of American Societies for Experimental Biology (FASEB) Journal (<https://doi.org/10.1096/fj.201800347>). He is currently following up on this discovery to attempt to determine what role cytokinins have in mammals.

Université de Montréal

Department of Biochemistry and Molecular Medicine

Correspondent: Luc DesGroseillers



Dr. Martin Sauvageau

New faculty members:

We are delighted to welcome new professors to the Department of Biochemistry and Molecular Medicine.

Dr. Martin Sauvageau is recognized for his work on long non-coding RNAs. His goal is to decipher how lncRNAs contribute to establishment/

progression of diseases *in vivo* and how they affect transcriptional programs and signalling pathways. His laboratory is located at the Montreal Clinical Research Institute (IRCM).

Dr. Mohan Malleshaiah is a specialist in stem cells, cell reprogramming and biology systems. His laboratory aims to identify cell state-specific regulators, elucidate their networks and characterize their dynamics, at the single-cell level, to eventually reverse-engineer cell states through cell re-programming. His laboratory is located at the Montreal Clinical Research Institute (IRCM).



Dr. Mohan Malleshaiah

Dr. Sébastien Lemieux is a specialist in functional and structural bioinformatics, aiming to understand biological processes such as cancer development. He creates virtual tools that convert unintelligible raw mega-data into accessible summarized forms that are more amenable to knowledge discovery. His laboratory is located at the Institute for Research in Immunology and Cancer (IRIC).



Dr. Sébastien Lemieux

These new professors use combinations of state-of-the-art techniques in biochemistry, genome editing, high-throughput genomics approaches and bioinformatics to solve problems related to gene regulation in human diseases.

Retirement:

We regret the retirement of **Dr. Normand Brisson** who was a Professor in the department for 34 years. Throughout his career, he contributed to deciphering the mechanisms that plants use to protect themselves from pathogens and to maintain genome integrity. His research was original, innovative and recognized worldwide. We wish him to realize all the dreams he has put on hold during his career and to enjoy his retirement.

Awards and distinctions:

Dr. Stephen Michnick has been elected a Royal Society of Canada Fellow in the Life Sciences Division of the Academy of Science. He was elected on the basis of his exceptional contributions to Canadian life, his remarkable scientific and academic accomplishments, and his leadership in advancing knowledge in Canada. He developed experimental and theoretical methods to determine how, when and where in the cell novel proteins interact with known proteins, and how groups of proteins work as ensembles to regulate decision-making by the cell. He has already discovered several mechanisms for which their interruptions are implicated in diseases and/or aging.

Dr. Adrian Serohijos was awarded a Junior 1 Research Scholarship from FRQ-S (Fonds de Recherche du Québec - Santé) for his project on antibiotic resistance entitled "Biophysique évolutive: intégrer la biophysique des protéines, la biologie évolutive et la génétique des populations pour prédire l'émergence de la résistance aux antibiotiques des microbes".

Dr. Mohan Malleshaiah was awarded a Junior 1 Research Scholarship from FRQ-S (Fonds de Recherche du Québec - Santé) for his project on stem cell programming entitled "Révéler les états des cellules souches, leurs transitions et leurs réseaux de régulation".

Dr. Martin Sauvageau was awarded a Junior 1 Research Scholarship from FRQ-S (Fonds de Recherche du Québec - Santé) for his project on lncRNAs in human diseases entitled "Caractérisation fonctionnelle et moléculaire des longs ARN non-codants associés à des maladies".

Dre. Marlene Oeffinger was awarded a Junior 2 Research Scholarship from FRQ-S (Fonds de Recherche du Québec - Santé) for her project on specialized ribosomes entitled "Disséquer les mécanismes et les composants qui définissent la fonction différentielle des ribosomes dans l'homéostasie cellulaire".

Dr. Vincent Archambault was awarded a Senior Research Scholarship from FRQ-S (Fonds de Recherche du Québec - Santé) for his project on cell division entitled "Comprendre et cibler la régulation spatiotemporelle de la division cellulaire".

Dr. Michel Bouvier was appointed as Chief Executive Officer for a second mandate at the Institute for Research in Immunology and Cancer (IRIC).

Université de Sherbrooke

Département de biochimie

Correspondent: Michelle Scott

In 2018, the Biochemistry department welcomed a new faculty member, **Dr. Benoit Laurent**, following his post-doctoral training at Harvard Medical School in Boston. Dr. Laurent is interested in the biology of genetics and epigenetics, and their relationship to aging and



New associate member of the Biochemistry department, Dr. Benoit Laurent

the nervous system, and is enthusiastically building his team. The Bachelor program saw big changes in 2018 with the retirement of our long-term coordinator of undergraduate research labs, **Jacques Lehoux**, after 38 years of dedicated service. **Frédéric Picard-Jean** took over his responsibilities.

Graduate student news:

Our 24th annual graduate symposium held in March 2018, co-organized by our two graduate student representatives, Gabrielle Deschamps-Francoeur and Carolin Brand, as well as by **Professor Michelle Scott**, was a success. **Professor Julie Fradette** from the Université Laval, our keynote speaker, discussed the use of human adipose tissue stem cells in regenerative medicine, while Tatiana Traboulsi, invited Ph.D. student from the Université de Montréal, presented on the transcriptional repression mechanisms of anti-estrogens in breast cancer cells. Ten Université de Sherbrooke graduate students from the Biochemistry department presented their research. The finalists were the following: **Carolin Brand** from the Bisailon group won the first prize, **Camille Martenon-Brodeur** from the Bisailon group won second prize while **Samuel Plante** from the Labbé group was the third-prize winner.



24th Annual Graduate Symposium of the Biochemistry department. From right to left: Julie Fradette (invited speaker and judge), Tatiana Traboulsi (invited speaker and judge), Xavier Roucou (department Chair), Fanny Thuriot (judge), Camille Martenon-Brodeur (2nd prize), Carolin Brand (1st prize), Samuel Plante (3rd prize), Michelle Scott (organizer and judge).

Prizes and distinctions:

Ph.D. student **Frédéric Couture** from the Day group won the prize for the best thesis, both at the Université de Sherbrooke level and from the association of deans of graduate studies of the province of Québec (ADÉSAQ). Ph.D. student **Jean-Michel Garant** from the Perreault and Scott labs won the Pierre-Chailler departmental prize for best student of the year, as well as the Douglas-Brown Faculty Prize. Several biochemistry faculty and staff were recognized and celebrated throughout the year. **Professor Luigi Bouchard** received the RECMUS Prize for the best graduate student director, as well as the Prix Tremplin 2018 for research and creation of the Université de Sherbrooke, and the Young Investigator Award of the Canadian Society of Endocrinology and Metabolism. Department Head **Professor Xavier Roucou** received the Marcel Bastin Prize for the quality of his teaching, student **Samuel Rouleau** was given the Jean-Pierre Cailler Prize for his involvement and excellence



Frédéric Couture, recipient of the best thesis prize for the Université de Sherbrooke as well as the ADÉSAQ (province-wide).

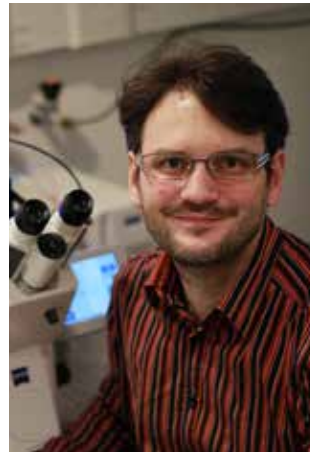
during his Ph.D., and lab coordinator **Jacques Lehoux** won the Maurice-Groleau Prize for leadership, involvement and innovation.

Université Laval

Department of Molecular Biology, Medical Biochemistry, and Pathology

Correspondent: Jean-Yves Masson

After one year of interim Chair **Robert Tanguay**, our department is now headed by **Yves Giguère**. The department is composed of 40 professors working on medical biochemistry and pathology, and mostly on basic research and molecular and cellular biology.



Dr. François Bordeleau

We are happy to welcome **François Bordeleau** as a new faculty member. François completed post-doctoral training in Cynthia Reinhart-King's laboratory, initially at Cornell University and now at Vanderbilt University. Dr. Reinhart-King is a pioneer and leading expert in the field of mechanobiology and the use of engineered disease models. François is now a FRQS Junior I scholar.

François' work focusses on the importance of physical cues of the microenvironment and tumour cell mechanics in driving cancer progression. His overarching goal is to understand the molecular basis of the tumour cell's abnormal contractile phenotype and what are the biological consequences and physiological ramifications on disease progression. Over the past 6 years, he has established himself as an emerging figure in the field of mechanotransduction and cancer mechanobiology. His multidisciplinary approach has provided numerous insights into the role of mechanical stimuli from the microenvironment in driving biological processes. His previous work provided the first evidence that a stimulus in the microenvironment (mechanical or otherwise) can alter splicing events. He discovered that increased matrix stiffness regulates splicing through an Akt/PI3K/Rho-mediated pathway. This work provides a framework under which the properties of the microenvironment could significantly alter a cell's protein landscape.

In a second project, also published in PNAS, he contributed to demonstrating how tissue mechanics can influence

vascular integrity and contribute to tumour progression. François' expertise in fine-tuning the mechanical properties within animal cancer models helped to elucidate how increased stiffness drives disruption of cell junctions and increased permeability of the tumour vasculature. This work constitutes a novel and alternative hypothesis to explain why different anti-angiogenic drugs have not delivered the expected benefits. He has also demonstrated an ability to develop technological tools and solutions, an ability few in the field share. Some of his earlier work with **Normand Marceau** has pioneered the use of optical tweezers. Recently, in a paper published in the *Journal of Biophotonics*, François and a team he supervised demonstrated how a microscopy method based on polarized light could be used to quantitatively measure cell contractility from both *in vitro* and *in vivo* samples. François' expertise in mechanobiology and unique interdisciplinarity at the interface of biology and physics/engineering will be a great asset to our department and Laval University.

Several members of our Department had significant accomplishments in 2018. **Samer Hussein** and **Marc-Etienne Huot** received FRQS Junior I and Senior scholarships, respectively. As for the research highlights, **Nicolas Bisson's** team (in collaboration with INRS, **Guy Poirier** and **Patrick Laprise**) reported that direct phosphorylation of SRC Homology 3 domains by tyrosine kinase receptors disassembles ligand-induced signalling networks (*Molecular Cell* 70:995). **Martin Simard** published in *Developmental Cell* that somatic and germline microRNAs form distinct silencing complexes to regulate their target mRNAs differently (*Developmental Cell* 47:239). **Jacques Côté's** team (in collaboration with **Jean-Yves Masson**) has shown that phospho-dependent recruitment of the yeast NuA4 acetyltransferase complex by MRX at DNA breaks regulates RPA dynamics during resection (*PNAS* 115:10028).

Jean Charron is now head of the Cellular and Molecular Biology program in replacement of **Josée Lavoie** who did a fantastic job in the last few years. **Carl Séguin**, **Normand Marceau**, and **Jacques Huot** retired in 2018. They were all heavily involved in teaching or course responsibilities. It was certainly difficult to see such nice colleagues leaving the department, and we all realized how much effort they were putting into training the next generation. Kudos Carl, Jacques and Normand - your tireless efforts are already missed!

University of Alberta

Department of Biochemistry

Correspondent: Joe Casey

Promotions:

Dr. M. Joanne Lemieux was promoted to full professor effective July 2019.

Graduate milestones:

Congratulations to M.Sc. graduates **Swai Mon Khaing** (Nicolas Touret), **Touhidul Islam** (Mark Glover), **Hector Varga** (Marek Michalak), **Graeden Winklaar** (Michael Overduin), **Steffane McLennan** (Michael Overduin) and **Ahmed Said** (Shairaz Baksh). Our Ph.D. graduates were **Wen An Wang** (Marek Michalak), **David Kramer** (Richard Fahlman), **Mohamed Salla** (Shairaz Baksh) and **Vrajesh Pandya** (Ing Swie Goping).

Events:

The Department of Biochemistry and the Faculty of Medicine and Dentistry at the University of Alberta graciously hosted a career celebration symposium in honour of **Dr. Brian Sykes** (Distinguished University Professor), this past June.



Former students, postdoctoral fellows, and colleagues travelled from all over the world to honour their former mentor and celebrate his accomplishments over his 35 years at the University of Alberta. The three-day event was kicked off by **Malcolm Irving** (*King's College London*), who gave the 29th John S. Colter lecture, followed by a full-day symposium which highlighted several of Brian's former trainees: **Frank Sönnichsen** (*Christian-Albrechts-Universität zu Kiel*), **Heather Dettman** (*Natural Resources Canada*), **Joe O'Neil** (*University of Manitoba*), **Jim Baleja** (*Tufts University*), **Patricia Campbell** (*Partner at Jones Day*), **Krishna Rajarathnam**, (*University of Texas Medical Branch Galveston*), **Matt Crump** (*University of Bristol*), **JianJun Wang** (*Wayne State University*), **Campbell McInnes** (*University of South Carolina*), **Xu Wang** (*Arizona State University*), **Tharin Blumenschein** (*University of East Anglia*), **Jan Rainey** (*Dalhousie University*), **David Sykes** (*Massachusetts General Hospital*), **David Wishart**



Dr. Brian Sykes

(University of Alberta), **Sam Sia** (Columbia University), **Lewis Kay** (University of Toronto). Finally, **Gary Shaw** (University of Western Ontario) concluded the symposium with the 12th William A. Bridger Lectureship.

Brian was born in Montréal and raised in Calgary. He received his B.Sc. in Chemistry (Hons.), at the University of Alberta in 1965, and completed his Ph.D. at Stanford University in 1969 with John D. Baldeschwieler. He established his own group in the Chemistry Department at Harvard University that same year. He was promoted to Associate Professor in 1975, just before being recruited back to his *alma mater*. Throughout his career, Brian published over 600 papers, graduated more than 30 Ph.D. students, and trained a large number of post-doctoral fellows. Brian pioneered protein NMR spectroscopy in Canada, and received numerous awards and distinctions throughout his career, including membership in the Royal Society of Canada and the Royal Society (London), the Flavelle Medal of the Royal Society, and the Gerhard Herzberg Spectroscopy award from the Canadian Society for Analytical Sciences and Spectroscopy. Brian

remains active in protein NMR research, pursuing his interests in prions and heart muscle regulatory proteins. (Report written by: **Olivier Julien**, **Peter Hwang**, and **Leo Spyropoulos**.)



Attendees at the career celebration symposium in honour of Dr. Brian Sykes

Membrane Proteins in Health and Disease - 61st Annual Meeting of the Canadian Society of Molecular Biosciences, Banff Alberta April 11-15 2018:

Members of the Department of Biochemistry served as the organizing committee for the annual society meeting, including **Howard Young**, who acted as Head of the Organizing committee. Presenting talks at the meeting were **Joanne Lemieux** and **Joe Casey**.

Malcolm Irving FRS, 29th Colter Lecture in Biochemistry 2018:

Malcolm Irving, FRS, delivered a wide ranging and excellent 29th Annual Colter Lecture to a packed audience in Biochemistry at the Faculty of Medicine and Dentistry on June 12th, 2018. Malcolm is currently Professor of Biophysics at King's College London, a position he has held since 1998, and Associate Director of Research at the Francis Crick Institute, London, where he is responsible for the Crick's partnership with Imperial College London, King's College London, and University College London (UCL).

Malcolm was Director of the Randall Division of Cell and Molecular Biophysics at King's from 2002-2016, and was also elected a Fellow of the Royal Society (London) in 2003 and a Fellow of the Academy of Medical Sciences in 2006.

Malcolm Irving's main research interest is in mechanisms underlying contraction and regulation of skeletal and cardiac muscle. Both types of muscle generate force and shortening by the relative sliding between myosin-containing thick filaments and actin-containing thin filaments. Malcolm and colleagues developed novel X-ray and fluorescence techniques, and used them to show that filament sliding in isolated skeletal muscle cells is driven by tilting of the light-chain domain of myosin. The relationships between these molecular structural changes and the physiological performance of skeletal muscle were described in a series of eight papers in *Nature* and *Cell* in the period 1992-2007. Recently Malcolm's research has focused on the regulation of muscle contraction by novel mechanisms involving structural changes in the thick filaments, which Malcolm and colleagues have shown to be key determinants of the normal performance of both skeletal and heart muscle in health and disease.

Gary Shaw, 2018 Bridger Lecturer:

On June 15th, the Department welcomed Professor Gary Shaw, Western University, Ontario to deliver a superb

12th Annual William Bridger Lecture in Biochemistry. The title of Dr. Gary Shaw's lecture was: "The Structural Biology of Proteins in Early-Onset Parkinson's Disease; From Inhibition to Activation".

Dr. Shaw received his B.Sc. (Hons) in Chemistry and Biochemistry from McMaster University. He completed a Ph.D. at McMaster under the direction of Dr. Ronald Childs. During graduate studies Gary used organic synthesis methods combined with X-ray crystallographic and NMR spectroscopic techniques to examine the structures and dynamics of model systems for the visual pigment rhodopsin.

Dr. Shaw worked with Professor Brian Sykes in Biochemistry at the University of Alberta as an Alberta Heritage Foundation for Medical Research post-doctoral scholar, applying NMR methods to examine the structures, interactions and assembly of calcium-binding peptides.

Gary joined the Department of Biochemistry at the University of Western Ontario as an MRC Scholar (1992-97) and later as a Canada Research Chair (2003-17). His research group has helped define three-dimensional structures and mechanisms of the E3 ligase Parkin, a causative enzyme in early-onset Parkinson's disease, and he has now identified how disease-causing substitutions can alter the function of this important enzyme.

University of Alberta

Department of Cell Biology

Correspondent: Andrew Simmonds

New faculty:

Cell Biology welcomed a new faculty member in 2018, **Dr. Qiumin Tan**. The Tan lab is interested in a quintessential signal transduction-transcription axis, the RAS/MAPK-capicua axis. In this pathway, the RAS/MAPK signal cascade modulates the transcriptional activity of capicua to control gene expression. Dysfunctions in this axis, either the upstream RAS/MAPK pathway or the downstream effector capicua, can cause a spectrum of developmental disorders and various cancers, depending on the cell types affected and the degree of dysfunction. Using multiple mouse genetic models, *in vitro* systems, and an integrated genomic, transcriptomic, and proteomic approach, the Tan lab addresses how the RAS/MAPK-capicua axis generates cell type-specific

output, and the impact on cellular and whole-organism



Dr. Qiumin Tan

physiology when this axis is perturbed. Answers to these questions will not only help understand the molecular underpinnings of disease pathogenesis, but also provide a therapeutic entry point with broad applicability to developmental disorders and cancer.

Other department news:

Also notable news was that our Chair, **Dr. Richard Rachubinski** was named the 2018 CSMB Canadian Science Publishing Senior Investigator Awardee. However, as we move into 2019, it will be a time of great change in Cell Biology as Dr. Rachubinski will be stepping down as Chair after over 20 years of service. Dr. Andrew Simmonds was named as a new associate editor of Genome, one of the two journal associated with CSMB. Finally in 2018, **Dr. Francesca Di Cara**, a post-doctoral fellow with the Simmonds and Rachubinski laboratories has started as a new faculty member at Dalhousie University.

University of Alberta

Department of Physiology

Correspondent: Emmanuelle Cordat

New faculty:

In 2018, the Department of Physiology at the University of Alberta has continued to expand with the recent recruitment of **Dr. Jesse Jackson** who came to us from the Howard Hughes Janelia Research Campus. Here is a short summary of Dr. Jackson's journey so far:

"I am originally from Alberta, and did my B.Sc. in Psychology at Red Deer college and the University of Calgary. I completed an M.Sc. in Neuroscience from the University of Calgary (2007) and a Ph.D. in Neuroscience from McGill University in 2013. My first post-doctoral fellowship was carried out at Columbia University, and focussed on using advanced *in vivo* microscopy techniques to measure the neural activity of neurons in the neocortex of awake behaving mice. Following this time, I moved to the Howard Hughes Janelia Research Campus, where I began a program to study the neurophysiological properties and function of the

mammalian prefrontal cortex. Part of this research led us to investigate a previously understudied and mysterious brain region known as the claustrum. The claustrum shares neural connections with most areas of the forebrain, yet its function remains unknown. In 2018, I began an Assistant Professor position at the University of Alberta, and one of the major themes of the laboratory is to identify how the claustrum communicates with other brain regions and participates in goal directed behaviors. The laboratory combines techniques such as electrophysiology, optogenetics, and calcium imaging to study how the claustrum and connected brain regions participate in the regulation of stress, anxiety, and learning. In addition, we are focussed on identifying basic principles of neuroanatomical organization, connectivity, of different interneuron subtypes in the forebrain and how these cells contribute to the shaping neural activity within neural networks."

Dr. Jackson's laboratory now counts two graduate students (Brian Marriott and Alison Do), three undergraduate students (Angela Fung, Adarsh Badesha, Mariam Sultan), a volunteer (Ryan Zahacy) and one Research staff member (Twinkle Joy).



Jesse Jackson lab members (L to R): Angela Fung, Adarsh Badesha, Alison Do, Jesse Jackson, Brian Marriott, Ryan Zahacy, Twinkle Joy (missing: Mariam Sultan).

Research news:

Other departmental news includes continued success in securing operating research grants: **Dr. Xing-Zhen Chen** was awarded a 2-year Kidney Foundation of Canada Biomedical Research grant (\$100,000 total) and **Dr. Greg Funk** received a 5-year Project Grant from the Canadian Institutes of Health Research (\$852,976 total) as well as a 2-year Lung Association of Alberta & NWT grant (\$30,000 total). Dr. Greg Funk's tremendous enthusiasm in mentoring was also rewarded by a University-wide *Killam Excellence in Mentoring Award* this year.



Members of Xing-Zhen Chen's lab

In 2018, the Department of Physiology at the University of Alberta published over 90 manuscripts including in *Journal of Physiology*, *Nature Reviews Neuroscience*, *Nature Communications*, *Cell Reports*, *Journal of Neuroscience*, *Scientific Reports*, *Biochemical journal*, *Channels*, *Frontiers in Physiology*, *Human Mutation*, *Blood*, *Hypertension*, *Circulation Research* to cite a few.



The Funk lab enjoying the scenery at Grassi Lakes

Teaching news:

On the teaching side, our Physiology Honours Program has been flourishing with a record of 117 undergraduate students enrolled in the Program last year, highlighting a great enthusiasm for our program among students. Additionally, our online PHYSL 210 course also continues to attract more and more undergraduate students willing to learn about human physiology, with more than 100 students registered in 2018.

We are proud of our departmental achievements for 2018 and are looking forward to an even more successful year in 2019!

University of British Columbia

Department of Biochemistry and Molecular Biology

Correspondent: Leonard Foster

After two years as Interim Head, **Leonard Foster** accepted the position of Departmental Head for an additional three years, to complete a five-year leadership term.

After many years of decline in our faculty as older members retired, Biochemistry and Molecular Biology is growing again! Four new faculty members were hired in the past year. After an exhaustive search for an Assistant Professor, we were delighted to offer the position to rising star **Dr. Sheila Teves**, from the University of California, Berkeley. The Teves' lab studies the processes that control gene expression in embryonic stem cells, to understand the programming underlying cell fate.



*New Assistant Professor,
Dr. Sheila Teves*

She uses a combination of genomics and single molecular microscopy, as well as conventional tools of molecular biology. She joins the Molecular Epigenetics research group in the Life Sciences Centre, together with two other members of BMB, LeAnn Howe and Ivan Sadowski.

A second search was completed in the last year, as well. A collaborative search with the Djavad Mowafaghian Centre for Brain Health (DMCBH) led to the recruitment of **Dr. Annie Vogel-Ciernia**. Dr. Vogel-Ciernia will join us in July, 2019, with a joint appointment between BMB and DMCBH. Her lab will study the epigenetic regulation of activity-dependent transcription. Specifically, her work focuses on understanding the mechanisms controlling gene expression in a variety of contexts including several mouse models of autism and intellectual disability. We look forward to welcoming her into the fold!

UBC was fortunate to be awarded a Canada Excellence Research Chair in Precision Cancer Drug Design, and then to recruit **Dr. Sriram Subramaniam** to fill this position. Dr. Subramaniam comes to us from the NIH in Bethesda, and is world-renowned for his development of techniques

for and use of cryo-electron microscopy for determining the high-resolution structure of large protein complexes.



*Canada Excellence Research
Chair in Precision Cancer Drug
Design, Dr. Sriram Subramaniam*

Completing an interesting circle, Dr. Subramaniam actually trained with one of our departments' past Nobel Laureates, Dr. Gobind Khorana. Dr. Subramaniam holds a joint appointment between BMB and the Department of Urology at UBC. He will strengthen an already outstanding structural biology group in our department.

Finally, this past year we also welcomed a familiar face to a formal appointment in our department. **Dr. Alice Mui** joins our department, now splitting her appointment between the Department of Surgery and BMB. Dr. Mui's lab studies the cytokine interleukin-10 (IL10), the major negative regulator of immune and hemopoietic cell function. Loss of the normal IL10 signalling has been associated with human inflammatory disorders and hematological malignancies.



Dr. Alice Mui

Research in the Mui lab is directed at characterizing the molecular signalling pathways utilized by IL10 in its target cells. Understanding these pathways provides insight into how IL10 works, and also supports the development of therapeutic strategies that mimic the beneficial effects of IL10.

In other news, numerous faculty members had exceptional years: **Brett Finlay** (also of the Michael Smith Laboratories) was inducted into the Canadian Medical Hall of Fame, while **Christopher Overall** and **Shoukat Dedhar** (BC Cancer Research Centre) were elected Fellows of the Royal Society of Canada. In addition, **Pieter Cullis'** lab got the first siRNA gene therapy drug approved by the FDA and EMA (European Medical Authority) to treat a previously incurable hereditary disease.

University of Calgary

Department of Biochemistry and Molecular Biology,
Cumming School of Medicine

Correspondent: Jonathan Lytton

The year 2018 has been a busy one in the Department of Biochemistry and Molecular Biology at UCalgary.

We were very excited to welcome three new primary members to the Department in 2018!

In January, **Dr. Sorana Morrissy** joined BMB and the Charbonneau Cancer Research Institute as a CRC Tier 2 chairholder in Precision Oncology. **Sorana** received



New BMB Assistant Professor and CRC Tier 2 Chairholder, Dr. Sorana Morrissy

outstanding training with Marco Marra at the BC Genome Science Centre and the University of British Columbia (Ph.D.) and then with Michael Taylor at the University of Toronto and the Hospital for Sick Children (post-doctoral fellow). Sorana's research program uses translational genomic and bioinformatic analyses with a focus on investigating tumour evolution and intra-tumour heterogeneity.

In October, **Drs. Myriam Hemberger** and **David Anderson** joined us, both affiliated with the Alberta Children's Hospital Research Institute. **Myriam Hemberger** is a CRC Tier 1 chairholder in Developmental Genetics and Epigenetics who moved to Calgary from the Babraham Institute and University of Cambridge in the UK. Myriam



New BMB Professor and CRC Tier 1 Chairholder, Dr. Myriam Hemberger

has developed a highly successful research program in placental biology and its impact on pregnancy outcomes. No sooner had Myriam joined us, than she was awarded the inaugural US\$1M Magee Prize from the Richard King Mellon Foundation and Magee-Women's Research Institute, together with two international colleagues!

Dr. David Anderson accepted the position of Instructor of Bioinformatics in the Department, with a focus on building and delivering bioinformatics content and research experiences in our flagship Bachelor of Health Sciences undergraduate science program. Dave received outstanding training from the University of Oregon (Ph.D.) and the University of British Columbia (NSERC and MSFHR Post-doctoral Research Fellow). Dave shares a passion for educational programs in informatics and precision medicine, with a research interest in the molecular mechanisms that underlie important evolutionary innovations.



New BMB Instructor in Bioinformatics, Dr. Dave Anderson

The Department also welcomed jointly appointed members, **Drs. Alex Lohman** and **Antoine Dufour**.

This year marked the departure of **Mark Bieda**, who had been an Instructor and Assistant Professor in the Department since 2008. Mark left to join Seattle Genomics as a Principal Scientist, and we wish him well in the next stage of his career.

Our members continue to be successful at CIHR despite challenging funding rates. In the past year, primary BMB members **Jennifer Cobb**, **Maja Tarailo-Graovac** and **Gareth Williams**, as well as joint members **Wayne Chen**, **Marco Gallo**, **Debbie Kurrasch** and **Raylene Reimer**, all obtained CIHR project grant funding.

Mayi Arcellana-Panlilio continues to excel in her role as Senior Instructor in the Bachelor of Health Sciences program. This year Mayi received the University of Calgary Students' Union Teaching Excellence Award, and the iGEM team she led won yet another gold medal at the Boston Giant Jamboree for their "Snip Equip Flip" project that aims to improve the stable integration of foreign genes into human cell targets!

BMB holds a scientific meeting in Banff each year, where we recognize research and educational achievements of both our faculty and graduate students. This year **Dave Schriemer** received the "Schultz Award for General

Excellence”, **Jason de Koning** the “Leon Browder Rising Star Award”, **Frans van der Hoorn** the “Hans van de Sande Leadership & Service Award” and **Mayi Arcellana-Panlilio** the “Education Award”. In addition, postdoctoral fellows, **Christoph Schraeder** and **Shrivani Sriskanthadevan-Pirahas**, as well as graduate students **Ayan Chanda**, **Lauren Mak** and **Beth Barretto** were recognized for their outstanding contributions.

BMB at the University of Calgary continues to grow and flourish, and we are recruiting both new students and faculty. Please visit our website at UCalgary.ca/bmb/ for more information about our Department.

University of Calgary

Department of Biological Sciences

Faculty of Science

Correspondent: *Vanina Zaremborg*

The Biological Sciences Department at the University of Calgary is currently organized in four clusters based on general research and teaching interests. They include Biochemistry, Microbiology, Cell Development & Physiology, and Ecology & Evolutionary Biology.

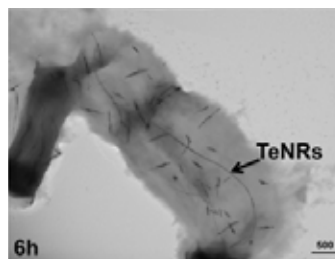
During this year, several colleagues from Biochemistry have been devoted to service in our Department: **Greg Moorhead** and **Elmar Prenner** continued in their roles of Associate Department Head -Graduate Program and -Operations respectively. **Sergei Noskov** initiated his term as Associate Head -Research. **Ken Ng** continued as chair of the Biochemistry cluster and **Marie Fraser** replaced **Vanina Zaremborg** as chair of the Biochemistry program.

Biochemistry is excelling in both research and teaching activities. It has been a successful year, with many of our members involved in securing important sources of funding to support the development of multidisciplinary initiatives. Several of our graduate students have been recognized with distinctions/awards for their excellent research and teaching achievements.

These are the highlights of the year:

On the research side, **Raymond J. Turner** was awarded a visiting professorship to the Institute of Advanced Studies in Italy in the fall. During his visit he lectured for 2 months in a course on microbial genomics at the University of Bologna, and was invited to give a number

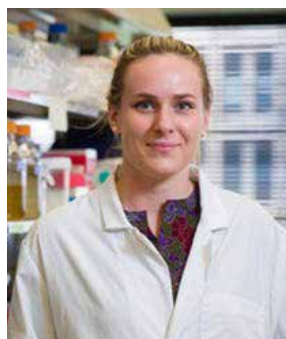
of seminars throughout northern Italy. Raymond’s expertise in metal-microbe interactions also led him to edit focussed journal issues on the topics of “Silver Based Antimicrobials”, “Genomics of bacterial metal resistance” and “Bioproduction of Metallic Nanoparticles and their Technological Applications”. Turner’s research with his Ph.D. student, **Elena Piacenza**, and post-doctoral fellow, **Dr. Alessandro Presentato**, in controlling the



Tellurium nanorods
(*Sci. Rep.* 2018 Mar 2;8:3923)

metabolism of bacteria to produce metal-based nanomaterials saw contributions published in *Frontiers in Microbiology*, *Scientific Reports*, *New Biotechnology*, and *Critical Reviews in Biotechnology*.

Special recognition goes to Turner’s Ph.D. student **Natalie Gugala** for leading the Outreach project for *BeakerHead - Petri Dish Picasso*; where children painted with bacteria (expressing different fluorescent proteins) for over 1,000 “paintings”. Natalie is also commended on her research on the biochemical mechanisms of metal toxicity. This was recognized in the news in relation to



Natalie Gugala

her studies to understand how silver kills bacteria, which was followed up by various on-line news feeds. Turner’s post-doctoral fellow, **Dr. Joe Lemire** transitioned to medical school, winning the Dr. Lydia Sikora Memorial Award recognizing students who are committed to medical research.



BeakerHead - Petri Dish Picasso

Peter Tieleman and his group continue to work on computational methods to study membrane proteins. A highlight was the publication of a paper in ACS Central Science on lipid-protein interactions based on several years of work by many current and former group members. This work considered how the presence of ten different membrane proteins changes the local lipid environment near the protein compared to the distribution of lipids in lipid-only areas of the membrane, using a complex mixture of over 60 different lipid types and years of computer calculations. A major conclusion is that the lipid environment around every protein is unique, which could be a significant driving force in shaping the lateral structure of biological membranes. The group was also involved in two extensive review papers now online for Chemical Reviews, on lipid-protein interactions and computational models to study increasingly realistic biological membrane models.

The **Ian Lewis** Research Group (LRG) continues to make significant advances in establishing rapid, metabolomics-based approaches for identifying pathogens and characterizing their drug susceptibility profiles. The group is currently testing and refining a suite of diagnostic devices that will markedly improve the efficacy of clinical microbiology workflows. In 2018, the LRG was the recipient of an \$11 million Genome Canada grant, through which it has launched a large-scale initiative to comprehensively assess the metabolomic, proteomic, and genomic profiles of pathogens and link these datasets with patient clinical outcomes. These datasets will be hosted on the *ResistanceDB.org* web portal and they will ultimately inform precision infection management practices via a hand-held app. The LRG is also working with researchers across Canada to better understand the role that metabolism plays in the development of microbiome-associated diseases, and it has solidified its role as the metabolomic and proteomics hub for the International Microbiome Centre. In addition, the LRG continues to expand its parasitology program and has launched several new studies investigating the role of metabolism in the evolution of human *Leishmania* and *Plasmodium* parasites.

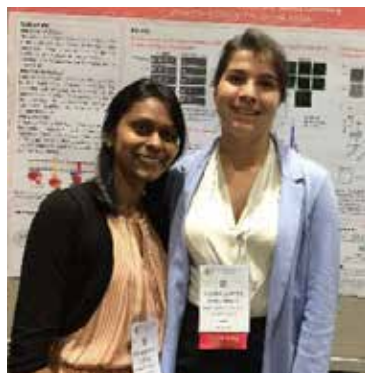
Elmar Prenner continued his teaching in the Nanoscience minor and Biochemistry programs, and will end his role of Associate Department Head for Research and Planning in 2019. Elmar renewed his NSERC discovery grant focussing on lipid-metal interactions. Other areas of research are

lipid-based anticancer drugs and nanoparticle-based drug delivery. His applied research dealing with the design of fluorescence instruments and bioanalytical assays has moved into commercialization. Elmar serves on the editorial board of BBA Biomembranes.

The group led by **Sergei Noskov** welcomed several new lab members this year and continued research in the areas of computational biology and membrane biophysics. Noskov was also very active in the advanced research computing community in Canada. He agreed to serve on the Board of Directors for West-Grid alliance. The lab activities received a significant momentum with a successful CIHR project application (co-PIs: **Peter Tieleman** and Henry Duff) enabling rational design of lipophilic compounds targeting cardiac channels. Noskov and Tieleman co-authored a comprehensive survey of membrane proteins/lipids models and published it in the prestigious Chemical Reviews journal. The lab expanded its work on machine-learning (ML) models in predictive cellular biophysics to analysis of molecular mechanisms underlying emergence of antibiotic-resistance in bacteria. In 2018, Noskov was co-PI in the successful Genome Canada LSARP submission led by **Ian Lewis** (above). The proof-of-principle applications of ML to proteomics data from clinical samples pioneered by a Research Associate, **Dr. Soren Wacker**, showed excellent promise as an analytical tool for clinical biochemistry of pathogens. Special highlights of the year were graduate and post-doctoral awards to lab trainees. The lab welcomed Eyes-High Post-doctoral Fellow **Dr. Hanif Khan**, joining from the University of Bergen, Norway. **Dr. Hristina Zhekova** successfully renewed her Alberta Innovates Post-doctoral Award. **Williams Miranda** was a recipient of Vanier and Killam graduate scholarships, while **Mario Valdez** has been selected as an International Eyes High Entrance scholarship winner. **Mary Kudaibergenova** was awarded an International Graduate Training award, and is now conducting her visit and experimental work at the National Institutes of Health in the U.S.

Vanina Zarembeg's group focusses on investigating the mechanisms that regulate glycerolipid metabolism and lipid signalling in eukaryotes. Current focus is on diacylglycerol and phosphatidic acid metabolism, anti-tumour lipid drugs and the biochemical characterization of acyltransferases. This year the group was awarded a Grand Challenge seed grant for collaborative work with Dr Belinda Heyne (Chemistry Department) supported

by the Faculty of Science, University of Calgary, to investigate oxidative stress responses to lipids using a genomics approach and fluorescent derivatives of tocopherol. **Marjan Tavassoli** (Ph.D.) defended her thesis on the regulation of the yeast glycerol-3-phosphate acyltransferase Gpt2 by phosphorylation. **Suria Ganesan** (Ph.D.) was the recipient of a Dean's Doctoral Scholarship and an Eyes High International Doctoral Scholarship awarded by the University of Calgary. Suria also received an ASBMB travel award to present her work on monitoring diacylglycerol in yeast at the Experimental Biology Meeting held in San Diego. **Laura Sosa** (Ph.D.) was invited to give an oral presentation at the Asilomar Chromatin,



*Suria Ganesan (left)
Laura Sosa (right)*

Chromosomes and Epigenetics Conference on her work on the role of lipid metabolism and telomere silencing in collaboration with Dr. Jennifer Cobb (Cumming School of Medicine, University of Calgary). Laura was awarded a QE-II graduate scholarship.

On the Teaching side, **Isabelle Barrette-Ng** was one of only 10 Canadians awarded a 2018 3M National Teaching Fellowship (<https://3mcouncil.stlhe.ca/resources/3m-fellows/3m-fellows-sorted-by/>), which is an award recognizing educational leadership and teaching excellence at the post-secondary level. She also won the University of Calgary Teaching Award for Educational Leadership in an informal role, and the McCaig-Killam Teaching award.

During the fall semester 2018, while on Research and Scholarship Leave, **Dr. Robert Edwards**, Senior Instructor, wrote a Bare Bones Biochemistry textbook to be used as an open education resource. He will be retiring on July 1 2019. Over more than two decades at the University of Calgary, he has helped to obtain accreditation for our Honours Biochemistry Degree, put our physical biochemistry course on a strong foundation, developed a number of inquiry-based teaching labs, served as President of the local chapter of Sigma Xi, and developed effective technology for visualizing proteins in PAGE gels without staining.

Elke Lohmeier-Vogel, Senior Instructor, finished her last term of teaching in the spring of 2018, and retired at the end of the year while on Research and Scholarship Leave. She participated with Dr. Mayi Arcellana-Panlillio (main PI) in guiding the 2018 iGEM team work during the summer. This University of Calgary initiative was presented at the international competition in Boston where it was recognized with gold medal status.



Left to right: Elke Lohmeier-Vogel, Vanina Zaremberg, Robert Edwards

We are extremely grateful to both Elke and Rob for their passion and dedication over all these years, helping develop a strong Biochemistry program. They remain our source of wisdom!

University of Guelph

Department of Molecular and Cellular Biology

Correspondent: Frances Sharom

New faculty appointments:

Rejuvenation of our department continued this year, as three new faculty members joined Molecular and Cellular Biology during 2018.

Dr. Jennifer Geddes-McAlister joined the department as Assistant Professor in July 2018. She completed her undergraduate and M.Sc. degree at the University of Lethbridge, with a focus on studying host-fungal interactions in an agricultural setting with quantitative proteomics techniques. She then moved to the University of British Columbia for her Ph.D. in the fungal pathogenesis lab of Dr. Jim Kronstad, where she received an NSERC CGS-D scholarship to support her research. Dr. Geddes-McAlister brought her expertise in proteomics to investigate the regulatory role of the cAMP/Protein Kinase A pathway on the cellular proteome and secretome of *Cryptococcus neoformans*, an opportunistic

fungal pathogen. Her work led to the discovery of the first biomarkers of cryptococcal infection and a novel drug-repurposing strategy using an FDA-approved anti-cancer drug, bortezomib, to reduce polysaccharide capsule production and treat cryptococcal infection. In 2015, she received the prestigious Alexander von Humboldt post-doctoral fellowship, as well as an NSERC fellowship, to continue her research in the laboratory of Prof. Dr. Matthias Mann at the Max Planck Institute of Biochemistry in Germany. Here, she defined the interplay between *Salmonella* and the host during infection, using state-of-the-art mass spectrometry and advanced computational proteomics to identify and mechanistically characterize novel and known virulence factors. At the University of Guelph, Dr. Geddes-McAlister investigates host-pathogen interactions of bacterial and fungal microbes from a systems perspective using quantitative proteomics. The overall goal of her research program is to



Assistant Professor Dr. Jennifer Geddes-McAlister

increase our fundamental understanding of the interplay between host and microbe during infection, and uncover novel therapeutic strategies to combat disease. When not pursuing her research, Jennifer enjoys exploring her new home in Southern Ontario with her husband and two young children.

Dr. Rebecca Shapiro joined the department as an Assistant Professor in January 2018. She completed her Ph.D. at the University of Toronto under the supervision of Dr. Leah Cowen. During her Ph.D., Dr. Shapiro deciphered genetic mechanisms that regulate virulence in human fungal pathogens. Her work uncovered critical new factors and pathways involved in mediating fungal virulence, the fungal response to environmental stress, and antifungal drug resistance. After completing her Ph.D., Dr. Shapiro received a Banting Post-doctoral Fellowship to continue her training as a post-doctoral fellow at the Broad Institute and MIT in the laboratory of Dr. James Collins. Here, she focussed on applying new CRISPR-based strategies to fungal pathogens, thus creating new biotechnology platforms to enable large-scale functional genomic analysis. Additionally, Dr. Shapiro collaborated

on projects focussing on development of new CRISPR systems in bacterial pathogens, and systems-level analysis of antibiotic survival. In her new laboratory at the University of Guelph, Dr. Shapiro continues to develop new CRISPR-based platforms for the study of fungal pathogens, and further exploits these technologies to study important facets of fungal biology and genetics, including fungal virulence, the fungal stress response, and anti-fungal drug resistance.



Assistant Professor
Dr. Rebecca Shapiro

In July 2018, **Dr. Wei Zhang** joined the department as an Assistant Professor. He has a unique training background in two disparate fields: DNA repair and protein engineering. His scientific achievement is evidenced by 20 publications in high-profile journals, 13 invited talks, 3 pending patents, and numerous awards, including the Mitacs Award for Outstanding Innovation and Cancer Research Society Scholarship for the Next Generation of Scientists. Dr. Zhang's Ph.D. research (in the Daniel Durocher group at the Lunenfeld-Tanenbaum Research Institute) centred on a fundamental chromosome biology question: how do cells differentiate natural ends (telomeres) from broken ends (DNA double-strand breaks, DSBs)? Indeed, the untimely action of telomerase on DSBs will lead to genome rearrangements and instability. He conducted a genome-wide screen to uncover new genes that are necessary to convert a DSB into a telomere. In the end he discovered a phospho-regulatory loop around a single serine residue of a telomere binding protein, involving the ATR family of kinases, PP2A phosphatases and a phosphatase activator, which underscores the delicate regulation of DSB repair. This work was highly recommended by the *Faculty of 1000* and was featured as "Top 7 in Cancer Biology" in March 2011 by *The Scientist*. In the screen he also identified a kinesin complex Cik1-Kar3 that contributes to telomere healing through its cellular motor activity. Later, with collaborators, he showed that this kinesin complex is critical for anchoring DSBs to the nuclear periphery and the spatial organization of DNA repair. To further broaden his scientific and technical expertise in cancer biology, he enrolled and graduated from a two-year radiation medicine program (STARS21, with a competitive fellowship

from CIHR) in the Department of Radiation Oncology at the University of Toronto.

For his post-doctoral studies, Dr. Zhang changed his research focus from “understanding” to “modulating” cell signalling, with the vision of bridging basic research and translational research. With a CIHR post-doctoral fellowship, he was mentored by Dr. Sachdev Sidhu at the University of Toronto in the areas of protein scaffold library design, directed evolution, protein engineering, and phage display, to synthesize molecules to manipulate protein activity in cells to reverse the dysregulated signaling pathways in human diseases. In particular, he engineered ubiquitin to modulate the activity of more than 50 human E3 ligases or deubiquitinases, enzymes that control specificity, efficiency and patterns of ubiquitination or deubiquitination, respectively. After the completion of the three-year CIHR fellowship, Dr. Zhang obtained a highly competitive Mitacs Elevate Fellowship to work on industrial collaborative projects under the mentorship of Dr. Sachdev Sidhu and Dr. Jason Moffat. He was fortunate to receive extensive training with Dr. Moffat on lentiviral-



Assistant Professor
Dr. Wei Zhang

based library construction, functional genomics, and cancer phenotypic screens. In his own lab at University of Guelph, Dr. Zhang is leveraging his protein design and engineering platform to manipulate cell signal transduction cascades for innovative cancer therapeutics. His lab is currently supported by funding from the Cancer Research Society and CIHR.

Faculty news:

Congratulations go to the following MCB faculty members for successfully renewing their new NSERC Discovery Grants in 2018: **Mike Emes**, **Rod Merrill** (+ Department of National Defence Supplement), **Robert Mullen**, and **Annette Nassuth**. In addition, new faculty members **Jasmin Lalonde**, **Melissa Perreault**, and **Rebecca Shapiro** (+ Accelerator Award) obtained NSERC Discovery grants. **Steffen Graether**, **Nina Jones** and **Chris Whitfield** participated in successful NSERC group applications (RTI grants) for new instruments and infrastructure. **Anthony Clarke**, **Cezar Khursigara**, **Melissa Perreault**, **Scott Ryan**, **Rebecca Shapiro** and **Wei Zhang** were awarded CIHR Project Grants, and **Wei Zhang** also won a Cancer Society Research Society Grant.

The September 2018 edition of the Canadian Journal of Microbiology entitled “A Decade of Research Advancements in the Legacy of Terrance J. Beveridge- An Integrated View of Prokaryotic Life” was dedicated to the memory of **Dr. Terry Beveridge**. Not only was Terry an internationally renowned microbiologist, he was also a Canadian microbiologist who spent his entire academic career at the University of Guelph. The issue presents a variety of manuscripts from colleagues and trainees that reflect on the progress in Terry’s areas of research interest (especially geomicrobiology) in the decade since his untimely death, and pay tribute to Terry’s influence on the scientific careers of many researchers.

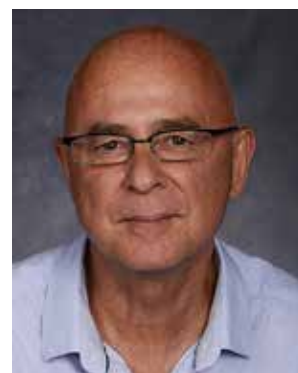
Awards and recognition:

In May 2018, **Dr. Claire Martin** (post-doctoral fellow, Jones lab) was honoured as one of a group of Women of Distinction nominees chosen by the Guelph YMCA-YWCA for their lifetime contribution to STEM (science, technology, engineering and math) and education, training and mentorship.



Dr. Claire Martin (centre) is congratulated by her supervisor, Dr. Nina Jones (left) and Dr. Jean-François Côté (right)

Dr. Chris Whitfield was awarded the 2018 Frederik B. Bang Award (established by the Stanley Watson Foundation), which recognizes research accomplishment by an outstanding senior investigator in the field of endotoxin and innate immunity. Over the years, Chris has made seminal contributions to understanding the structure and function of the molecular machines that assemble and export lipopolysaccharides (LPS) and other bacterial glycoconjugates.



Dr. Chris Whitfield, winner of the 2018 Frederik B. Bang Award

Dr. Emma Allen-Vercoe received a Partners in Research Biomedical Ambassador Award for her exemplary efforts in outreach education, research and leadership benefitting Canadian elementary and secondary school students and the Canadian general public.



Partners in Research Biomedical Ambassador Award winner, Dr. Emma Allen-Vercoe

Retirements:

Faculty retirements continued in 2018, with **Dr. Azad Kaushik** retiring in August 2018 after 27 years of exemplary service to the university.

Graduate student awards:



Vanier Canada Graduate Scholarship winner, Morgan Stykel

Morgan Stykel (Ryan lab) received a Vanier Canada Graduate Scholarship. These prestigious awards recognize leading Ph.D. students for academic excellence and research potential. Morgan will continue her studies of Parkinson's disease, a disorder that causes brain cells to degenerate.

The following students obtained NSERC awards in 2018: NSERC Post-doctoral Fellowship, **Sean Liston** (Whitfield lab); NSERC CGS-Masters Scholarships, **Steven Kelly** (Whitfield lab), **Laura Tempelhagen** (Wood/Seah lab), and **Madison Wright** (Khursigara lab); NSERC CGS-D3 Doctoral Scholarships, **Andrea Brumwell** (Uniacke lab), **Liam Doyle** (Whitfield lab), **Hayley Lau** (Jones lab), and **Chad Williamson** (Jones lab).

Donald R. Phillips Scholarships were awarded to **Michal Pyc** (Mullen lab) and **David Sychantha** (Clarke lab).

Victoria Lesy (Colasanti lab) won an Arrell Scholarship, and **Chad Williamson** (Jones lab) received the Roche Molecular Biochemicals Award of Excellence. **Mark Minow** (Colasanti lab) was awarded the Class of OAC '60 Award for Outstanding Teaching Assistant, an ICI Scholarship in Biotechnology went to **Michal Pyc** (Mullen lab), and **Simone Renwick** (Allen-Vercoe lab) won an Ontario Trillium Scholarship.

CIHR Travel Awards went to **Megan Brasher** (Coppolino lab) and **Manali Tilak** (Jones lab), while **Sahar Mehrpooyan** (Emes/Tetlow lab) won a Mitacs Globalink Travel Award.

Ashley Brott (Clarke lab) won an Outstanding Poster Award at the Canadian Glycomics Symposium.

Congratulations go out to all our student award winners!

University of Lethbridge

Correspondent: Ute Kothe

Dr. Borries Demeler joins U of Lethbridge as Canada 150 Research Chair

One of the world's leading biophysics scientists, **Dr. Borries Demeler**, a world-renowned expert on analytical ultracentrifugation (AUC), has joined the University of Lethbridge as part of the Canada 150 Research Chairs program. Demeler, previously a professor in the Department of Biochemistry and Structural Biology at the University of Texas Health Science Center, San Antonio brought his sophisticated analytical lab to Lethbridge in August 2018, and is the newest member of the Alberta RNA Research and Training Institute (ARRTI) and the Department of Chemistry and Biochemistry at the University of Lethbridge.



Dr. Borries Demeler is a new Canada 150 Research Chair at the University of Lethbridge

"This truly promises to be one of the most impactful additions we've made to our faculty," says Dr. Erasmus Okine, the University's Vice-President Research. "Scientists of his calibre are rarely available, and the

opportunities his research program will create here at the U of L and for Canadian researchers in general are incredible. We're very fortunate to be part of the Canada 150 Research Chairs program and are thrilled to welcome Dr. Demeler to southern Alberta." Demeler's work is in the field of hydrodynamics, specifically focussed on software and hardware developments in analytical ultracentrifugation and computational biophysics. The impact of his multidisciplinary research program is reflected in over 300 national and international research collaborations his group has engaged in over the past six years. He has led the development of advanced high-performance computing platforms involving parallel supercomputing and cloud-based Science Gateways, an infrastructure that is now implemented worldwide with servers in the U.S., Germany, India and Australia. Moreover, his work is critical for the quality control and mechanistic studies of next-generation therapeutics for many diseases. "Simply put, he is one of the foremost leaders in developing tools that allow very accurate and robust studies of therapeutic proteins, antibodies and other molecules," says Dr. Trushar Patel, a researcher and professor in the U of L's Department of Chemistry and Biochemistry. "Researchers here who are studying molecules that are linked with diseases such as cancer and bacterial and viral infections are excited that Dr. Demeler is joining the U of L. His relocation to Lethbridge will strengthen our position in biophysical research on a global scale and foster collaborations resulting in high-impact publications and the training of next-generation researchers with highly sought-after techniques for the biopharmaceutical industry."

Moving his research lab to Canada is a homecoming of sorts for Demeler who, after moving to the U.S. from his native Germany as a teen, earned his B.Sc. from the University of Montana in Missoula. He then moved to Oregon where he completed a Ph.D. in biochemistry and biophysics at Oregon State University, and has spent the last 25 years at the University of Texas. "During my undergraduate time, I fell in love with Montana, especially the Rocky Mountain front, and built many lifelong friendships, in particular with members of the Montana Blackfeet tribe just across the border from Lethbridge," says Demeler. "I always longed to return to this part of the world and established a second home in Western Montana to enable frequent visits. The right professional opportunities never materialized to allow a permanent move back to this region – until now." Demeler's passion

for science outreach activities, working with minority populations and the interdisciplinary nature of his research program are particularly well aligned with the U of L mission. "I believe in the importance of engaging students from a young age and I always found it very rewarding to recruit high school students from the San Antonio area for summer internships in my laboratory and open their minds to the world of biophysics, hydrodynamics and computational sciences," he says. "I also hope to continue to be able to recruit students from minority pools, in particular from the local Blackfeet Nation, among whom I have many friends, stemming from my time at the University of Montana and while serving in the American Indian Science and Engineering Society."

His lab, known as the Centre for Analytical Ultracentrifugation of Macromolecular Assemblies (CAUMA), will establish a hydrodynamic research centre at the U of L, expanding this important method of research to new research groups throughout the country. He plans to set up a regional biophysics alliance with investigators at the University of Montana and share instrumentation, expertise and teaching between the two schools. "I am intrigued by the possibilities of working at a liberal arts institution where an inclusive and progressive climate is encouraged," he says.

NSERC CREATE grant for RNA Bioengineering and Innovation Network offered jointly with the Université de Sherbrooke

The U of Lethbridge, in partnership with the Université de Sherbrooke, has been awarded \$1.65 million over the span of six years to develop the RNA Bioengineering and Innovation Network Collaborative Research and Training Experience (CREATE). The U of Lethbridge and the Université de Sherbrooke are recognized as the country's leading RNA-research institutions and through this grant, look to jointly train job-ready scientists.

The next revolution in biotechnology includes rationally designed ribonucleic acid (RNA)-based systems, molecular machines and devices. In order to prepare the next generation of RNA researchers, the U of Lethbridge, Université de Sherbrooke, and industry collaborators, have come together to offer the new RNA Innovation program. This unique partnership aims to produce highly qualified personnel with skills in advanced RNA research, scientific leadership, and industry experience. "We are

very excited about the training possibilities offered to Université de Sherbrooke and University of Lethbridge students!” says Dr. Michelle Scott, grant co-applicant and Université de Sherbrooke professor, “these will be instrumental in helping to prepare our students for future biotech jobs.” Trainees will develop professional skills in management, leadership, communication, and ethics. They will graduate with “job-ready” knowledge of applied and basic research and receive funding for on-site industry training and project development, while gaining access to leading industry partner collaborations. A strong supporter of the new program, Rory Degenhardt from Dow AgroSciences says: “We actively seek out graduates with advanced technical and professional skills and are strong advocates for programs that help to develop those skills.”

The RNA Innovation program is comprised of two key components, an entrepreneurial research and development challenge (deepYellow Challenge) and an extensive internship program (the Twinning Program). In the deepYellow Challenge, trainees will collaborate as a team to solve a complex scientific problem proposed by the program’s industry partners. Through the Twinning Program, all trainees will be matched with a specific industry internship, providing students with mentorship and a personalized networking experience. Contacts developed during this time will be extremely beneficial to the trainees for their future transition into the workforce. “The University of Lethbridge is committed to upholding excellence in both research and graduate education. This program will contribute to the training of high-quality personnel, and effectively ensure the sustainability of Canada’s future knowledge-based economy,” states Dr. Erasmus Okine, VP Research at the University of Lethbridge. **Dr. H.-J. Wieden** from the U of Lethbridge, who led the NSERC CREATE application process says, “The students engaging with RNA Innovation will be on the leading edge of RNA research and will graduate with strong connections to industry partners and the skills that they are looking to hire.”

U of Lethbridge iGEM teams awarded gold and silver at international Giant Jamboree

The U of Lethbridge’s iGEM students have proven once again they are among the best and brightest scientists in the synthetic biology field. From over 300 teams, representing countries from all over the world, the U of L’s collegiate team secured a gold medal and the high

school entry a silver at the 2018 International Genetically Engineered Machine (iGEM) competition in Boston, MA.



The Lethbridge high school iGEM team (left) and collegiate iGEM team (right) participated successfully in the international jamboree 2018

The collegiate team’s project *VINCenT* focussed on developing tools for other synthetic biology researchers. Targeting specific tissues, cell types, or cellular organelles is important for the correct treatment of many diseases. The U of L team created software that would help others overcome these problems. The team members also demonstrated how they can successfully encapsulate cargo within P22 “nano-compartments” that can target zebra and quagga mussels with species-specific toxins. One of the largest problems facing Alberta waterways, zebra and quagga mussels are considered aquatic invasive species and a threat to the Alberta economy, specifically agriculture, tourism and recreation, as they destroy natural lake ecosystems and fisheries. Work on this application will continue in the future.

The Lethbridge high school team’s project, *Cu Later*, described a method for the capture and removal of metals from tailings ponds and effluent water using an engineered bacteriophage system and received a silver medal and nomination for best model.

Representatives from the U of Lethbridge were also involved in core activities for the iGEM Giant Jamboree. **Dr. H.-J. Wieden**, also a primary investigator for the U of L collegiate team, was one of the competition judges, and **Chris Isaac**, U of Lethbridge biochemistry graduate student, participated in the iGEM Safety Committee.

Alberta RNA Research and Training Institute welcomes Gairdner Awardee Dr. Azim Surani for RNA and Epigenetics Symposium

The U of Lethbridge's Alberta RNA Research and Training Institute (ARRTI) was proud to host Dr. Azim Surani, recipient of the 2018 Canada Gairdner International Award, in October 2018. This marks the sixth consecutive year that the University has had the opportunity to present a Gairdner Laureate. Dr. Surani is the director of Germline and Epigenetics Research, Wellcome Trust Cancer Research U.K. Gurdon Institute, and a Marshall-Walton Professor, University of Cambridge. He is one of five 2018 Canada Gairdner International Laureates and, along with Dr. David Solter, has been recognized for the discovery of mammalian genomic imprinting and its consequences for development and disease such as developmental syndromes like Beckwith-Wiedemann, Angelman and Prader-Willi, and a variety of cancers and neurological disorders. The work by Drs. Surani and Solter is one the key discoveries that started the field of epigenetics. "It is exciting for our students to learn in person from Dr. Surani about the recent progress on the role of DNA modification in development of organisms and how the inappropriate DNA modifications lead to diseases such as cancer," says Dr. Trushar Patel, a researcher and professor in the U of L's Department of Chemistry & Biochemistry. And Dr. H.-J. Wieden, director of ARRTI, adds: "We are very fortunate to be able to bring such a researcher to our campus, to speak on his research and inspire our students." Dr. Surani's visit to the U of L included a public keynote lecture on "From genomic imprinting to the human germline" to kick off a symposium focused on RNA and Epigenetics. The lecture was followed by a series of lightning talks by local and visiting researchers in the fields of RNA and Epigenetics.

One of the main goals of the Gairdner Foundation program is also to inspire the next generation of researchers by giving high school students the opportunity to hear from and interact with the world's leading researchers. "Scientists are normal people, but some scientists like the Gairdner awardees have made extraordinary scientific discoveries," says Dr. Ute Kothe, a professor in the Department of Chemistry and Biochemistry. "It was therefore very inspiring for the students at a local school to meet Dr. Surani and to hear about his life in a presentation entitled "Out of Africa to a Career in Science".

U of Lethbridge new Science and Academic Building is ready to host researchers and to enable transdisciplinary research

The University of Lethbridge's new Science and Academic Building is complete, and researchers are getting ready to move in over the summer of 2019. The Science and Academic Building will be one of the most advanced facilities for teaching and researching the sciences in the country. Sustainably designed with local climate in mind, students, faculty and community will come together for innovation and discovery. Its open and flexible laboratory environment will encourage and foster research between all the sciences at the U of Lethbridge, creating opportunities for transdisciplinary collaborations. Ideas will flourish and give students and faculty innovative ways to problem solve with more resources available than ever before.

Brian Sullivan, Destination Project program director, says construction of the Science and Academic Building will be completed in late Spring 2019, with its first intake of students in the 2019 Fall Semester. Sullivan says: "It's always exciting to see the end of a project approaching and we look forward to opening the doors and realizing its completion." The University of Lethbridge's Science and Academic Building has been shortlisted as a finalist for an award at the World Architecture Festival 2018. "We've always known we were creating something iconic and that this building would set a new standard for science and academic facilities in the country. Now that we're nearing completion, it's exciting to see it take shape and be recognized for its design and functionality, which we believe will create a revolutionary teaching and research environment," says U of L Provost and Vice-President (Academic), Dr. Andy Hakin.

"The Destination Project has been an experience of a lifetime," says Vice-President, Architecture for Stantec, Michael Moxam. "The Integrated Design Process that brought all the University stakeholders and our incredible design team together has resulted in a vision for the Science and Academic Building that will break new ground in transdisciplinary education and research in science, in environmental sustainability, and in campus building. The iconic landscape that so inspired Arthur Erickson in the design of University Hall has equally inspired us and this will be clearly evident in the experience of the building."

University of Manitoba

Department of Biochemistry and Medical Genetics,
Rady Faculty of Health Sciences

Correspondent: Barbara Triggs-Raine

Changing places and new faces:

Our department welcomed its newest faculty member in September of 2018, **Dr. Meaghan Jones**. Dr. Jones joined us as an Assistant Professor in the department, and Scientist in the Children's Hospital Research Institute of Manitoba. She completed her B.Sc. at Mount Allison University, followed by a Ph.D. in molecular epigenetics, and post-doctoral training in population epigenetics, both

at the University of British Columbia. Dr. Jones' current research focus is the role of epigenetic changes in the link between mothers' exposure to inhaled pollutants like cigarette smoke and their children's risk of developing asthma. Dr. Jones is excited to be beginning her independent career in BMG, and is happy to have survived her first Prairie winter.



Dr. Meaghan Jones

Fall 2018 was a time of change for the Department with **Dr. Louise Simard** ending a very successful 12-year term as Head of the Department. During this time there were several new recruits to the department, the development of a new M.Sc. program in genetic counselling, and the introduction of a computational biology teaching and research theme. Dr. Simard has taken on a new administrative role as an Associate Dean, Graduate Studies, where she will continue to provide leadership in graduate studies, an area in which she has had a life-long interest.

The new Head of the Department, **Dr. Barbara Triggs-Raine**, has been with the department for more than 25 years. She has a long-standing research interest in understanding and treating rare genetic disorders using both genetic and biochemical approaches. She hopes to grow the department's role in undergraduate teaching within the Bachelor of Health Sciences. Interestingly, Dr. Triggs-Raine follows in the footsteps of a series of female department Heads starting with Dr. Phyllis McAlpine

(Head of the Department of Human Genetics before its merger to form Biochemistry and Medical Genetics), followed by Dr. Jane Evans, and most recently Dr. Louise Simard.

Celebrating outreach:

Dr. James Davie has been an avid member of the Canadian Society for Molecular Biosciences for many years. This year he expanded his role as a community leader in science, taking on the office of general secretary of the International Union of Biochemistry and Molecular Biology (IUBMB) in January of 2019. This Union promotes research and education in biochemistry and molecular biology around the world.



Dr. James Davie

Dr. Francis Amara is a leader in the development of research and education in Sierra Leone, which after years of civil war has very little infrastructure for STEM. He is committed to working with the classmates of his youth to give back to their country of birth. He recognizes the importance of empowering the people within Sierra Leone to be the next generation of doctors, teachers and researchers. He has played a very personal role in raising money to build infrastructure and is involving members of the department in developing educational opportunities for citizens of Sierra Leone. This will be furthered by his recent appointment as Ambassador for the IUBMB. Following in his footsteps, **Dr. Etienne Leygue** of our Department will join him in Sierra Leone this spring to teach and train future leaders in STEM.



Professional development in STEM in Sierra Leone



Sierra Leone teachers with their certificate of participation

Faculty awards and recognitions:

Dr. Pingzhao Hu was recognized for his innovation in artificial intelligence through the Interstellar Initiative Award from the New York Academy of Sciences and Japan Agency for Medical Research and Development. This award recognizes and brings together promising early career investigators in the fields of cancer, neuroscience and artificial intelligence.



The international team (from left to right: Dr Pingzhao Hu (Canada), Dr. Anna Junker (Germany) and Dr. Kazuhiro Murakami (Japan) at The Interstellar Initiative in the New York Academy of Sciences on June 22, 2018

Dr. Hu is one of the founding members of Visual and Automated Disease Analytics (VADA) program, an NSERC Collaborative Research and Training Experience (CREATE) funded Program. The VADA program is one of the only few programs in Canada with a focus on health data science. Dr. Hu also plays an active role in the advancement of statistical genetics within our Institution, and for the Statistical Society of Canada by organizing workshops, journal clubs, training and case studies competitions.

The laboratory of **Dr. Mojgan Rastegar** received one of the two 2018 Ontario Rett Syndrome Association (ORSA) research awards for “Investigating the effect of Metformin

on MeCP2 homeostasis as a potential therapeutic strategy for Rett Syndrome”. Also her laboratory was recognized and supported by ORSA to create a “Human Rett Syndrome Brain Tissue Laboratory for Translational Research and Innovation”.

Future leaders:

Departmental trainees at all levels demonstrated their commitment to excellence and innovation in research, acquiring many provincial and national awards. Award recipients were Marjorie Buist, Rachelle Dinchong, Ashleigh Hansen, Angela Krutish, Chloe LePage (CIHR Canadian Graduate Scholarship-Masters); Tricia Choquette, Shavira Narrandes (Research Manitoba Masters Studentship); Lucile Jeusset, Berardino Petrelli (Research Manitoba Ph.D. Studentship); Taryn Athey, Promita Ghosh, Claire Morden (Manitoba Graduate Scholarships).



Graduate students and faculty at the Awards Reception in November 2018

Of note, **Dr. Brent Guppy**, post-doctoral fellow with Dr. Tamra Ogilvie, was awarded the 2018-2020 William Donald Nash Brain Tumour Foundation of Canada Fellowship for his project “Enhancing selumetinib-mediated killing of SHH medulloblastoma”. Of note, only one of these fellowships is awarded annually, and this is the first time the award has gone to Manitoba. We were also very proud that second year genetic counselling student **Ashleigh Hansen** was awarded the National Society of Genetic Counselors International Special Interest Group Scholarship to support her research, “Exploring Immigrants’ Perceptions of Genetic Counselling.”

University of Ottawa

Department of Biochemistry, Microbiology and Immunology

Correspondent: Kristin Baetz

The Department of Biochemistry, Microbiology and Immunology at uOttawa has undergone a dramatic expansion in the past 5 years. We are pleased to introduce you to our latest talented early career researchers.

Dr. Vanessa D'Costa

Dr. Vanessa D'Costa joined our department in July 2019. She completed her Ph.D. in Biochemistry at McMaster University, and pursued her post-doctoral studies in the Program for Cell Biology at The Hospital for Sick Children. Dr. D'Costa's lab is focussed on understanding the intricate host-microbe relationships underlying bacterial infection. Understanding these complex and dynamic interactions at a molecular level can provide important clues as to how we can target infectious microbes therapeutically. It can also provide new tools to study host cell biology, and uncover new fundamental processes that contribute to the host cellular immune response.



Dr. Vanessa D'Costa

Dr. Mirelle Khacho

Dr. Khacho's research focusses on the role of mitochondria and their dynamic nature in the regulation of stem cell fate decisions and longevity. Disruption of mitochondrial function and dynamics, leading to elevated reactive oxygen species (ROS), are a common pathogenic factor in many degenerative diseases and during aging. Dr. Khacho's studies have uncovered an important role for mitochondrial dynamics in maintaining the self-renewal and regenerative capacity of stem cells. These studies have established that loss of mitochondrial dynamics and elevated ROS impair the function and life-long maintenance of stem cells. Her future studies will aim at elucidating the fundamental role of mitochondrial dynamics and ROS in the regulation of stem cells in muscle degenerative diseases and aging. As such,

the long-term goal of her research program is to establish therapeutic strategies to enhance mitochondrial function and dynamics in stem cells in order to restore the regenerative potential of tissue within the context of degenerative disease and aging.



Dr. Mirelle Khacho

Dr. Jyh-Yeuan (Eric) Lee

Dr. Jyh-Yeuan (Eric) Lee joined the department as an Assistant Professor in 2017. He obtained his doctorate from the University of California, Riverside, in biochemistry and molecular biology, with a focus on cryo-electron microscopy and drug resistance. He completed post-doctoral research first at Texas Tech University Health Sciences Center, and then at University of Texas Southwestern Medical Center, where he developed expertise in membrane protein engineering and X-ray crystallography. The primary objective of his research team is using protein structural biology and biophysics methods to study the roles and regulation of the molecular lipid-transporting machinery that regulates cholesterol metabolism and lipid homeostasis. Dr. Lee's research has focussed on structure-function studies of mammalian ABC transporters, a group of membrane proteins that use ATP energy to regulate cross-membrane trafficking of small molecules (such as cholesterol, phospholipids or antibiotics). Currently, his laboratory focusses on the molecular machinery responsible for cholesterol and phospholipid trafficking on cellular membranes.



Dr. Eric Lee

Dr. Erin Mulvihill

Erin Mulvihill joined the department in July 2017, and the main objective of her lab is to investigate the cardiovascular complications of Type 2 diabetes. She completed her graduate studies in lipoprotein metabolism at the University of Western Ontario with Dr. Murray Huff. She then pursued a post-doctoral fellowship

in incretin biology at the Lunenfeld Tanenbaum Research Institute under the direction of Dr. Daniel Drucker. She has recently received an Early Investigator award from both Diabetes Canada and CIHR.



Dr. Erin Mulvihill

Dr. Jim Sun

Dr. Sun joined uOttawa in July 2017 as an Assistant Professor. He obtained his Ph.D. at the University of British Columbia and completed his post-doctoral training at the University of Alabama at Birmingham. During this time, Dr. Sun made significant contributions to our current understanding of the dynamic host-pathogen interactions between the macrophage and Mycobacterium tuberculosis. The Sun laboratory is focussed on understanding the pathogenesis of tuberculosis using a multi-disciplinary approach that combines microbiology, cell biology, immunology, and systems biology. Through studying the interface between the host and pathogen, Dr. Sun seeks to identify novel host targets that are hijacked during infection, which enable the bacteria to persist within macrophages, the immune system's fighter cells.



Dr. Jim Sun

University of Saskatchewan

Department of Biochemistry, Microbiology and Immunology

Correspondent: Scot Leary

It has been four years since we contributed a report to the annual CSMB Bulletin. Oh, how things have changed! July 1st, 2018 saw our ancestral department, Biochemistry, merge with the Department of Microbiology and Immunology to form the Department of Biochemistry, Microbiology and Immunology. In addition to the original members of both departments, we welcomed **Troy Harkness** to the fold, and his transfer from the Department of Anatomy and Cell Biology brought our total faculty complement to 28.

An interim head, **Bill Roesler**, was appointed for an 18-month period and tasked with overseeing the harmonization of our collegial processes. Bill recognized that with the increased size of the department, we would benefit greatly from having an assistant head and the department was fortunate enough that **Linda Chelico** agreed to serve in this capacity. We have also benefitted tremendously, as we reorganize and reform our various collegial processes, from the recent recruitment of two superb administrative staff; Shannon DeGagne is assistant to the head, while Barb Stuckless oversees our graduate studies program. While there was optimism that the merger would go smoothly, our expectations have been exceeded in this regard! In fact, we have ratified changes to unify all of our collegial processes, including the proposed merger of our two graduate programs, which will soon be considered at the University level by the College of Graduate and Postdoctoral Studies. We are grateful to the graduate co-chairs **Jeremy Lee** and **Sylvia van den Hurk** and the graduate affairs committees for all their hard work, and to the faculty for being open as we melded unique elements of the original programs to craft a new one.

Faculty news:

In addition to the merger, we have witnessed changes with respect to the composition of our faculty, and expect this to be a continued theme over the next few years. In September 2018, we welcomed **Kerry Lavender** (Rocky Mountain Laboratories/NIH) to the department. We are currently in the process of hiring two new recruits at the assistant professor level with an expected start date of July 2019, and are very excited by the high number of quality applications we have to consider.



*New faculty member,
Dr. Kerry Lavender*

Faculty renewal has been made possible by way of the upcoming retirements of **Hughes Goldie** (1981-2019), **Calliopi Havele** (1988-2019) and **Peter Howard** (2002-2020). We thank Popi, Hughes and Peter for their invaluable contributions over the years and wish them well in retirement. We also wish to share with you the sad news that one of our adjunct members, Gordon Gray,



Gordon Gray

recently passed away at the age of 51. Gord's memorial was heavily attended by his University colleagues, and Bill Roesler's eulogy reminded us of his sharp mind, joy for life, loyalty and tenacity. Several of Gord's past trainees also shared a few brief words emphasizing how committed he was to mentorship. He will be sorely missed.

Research news:

We also wish to share several noteworthy developments on the research front. This year saw **Mirek Cygler** successfully renew his Tier 1 CRC chair for another 7 years. **Linda Chelico** had quite a year too, as she secured two CIHR Project grants to work on the role of APOBEC3 cytidine deaminases in HIV-1 and cancer, and was promoted to Full Professor to boot. Congratulations Linda! **Scott Napper**, **Sylvia van den Hurk** and **Wei Xiao** all received sizeable grants-in-aid of research from the Saskatchewan Agriculture Development Fund. **Joyce Wilson** and **Scott Napper** also received 5-year NSERC Discovery grants.

Other department news:

This past year we have also been fortunate to have **Joyce Wilson**, **Yu Luo** and **Scot Stone** work together to assemble a stellar lineup of speakers for our combined seminar series. Of these, we were blessed to host about a dozen external speakers and hear about their most recent research developments. We value their willingness to contribute to the education of both our undergraduate and graduate students, and we hope to secure sufficient funds from the College of Medicine to ensure the sustained contributions of invited speakers to our training program for years to come.

We would be remiss not to acknowledge the successes of **Zoe Gillespie** (Eskiw lab) and **Dr. Amit Gaba** (Chelico lab). Zoe was awarded a Vanier Canada graduate scholarship in support of her Ph.D. studies on progeria and aging, while Dr. Gaba was the recipient of a post-doctoral fellowship from the Saskatchewan Health Research Foundation.

University of Toronto

Department of Biochemistry

Correspondent: Alex Palazzo

Faculty news:

2018 was an exciting year for the Biochemistry Department at the University of Toronto. **Justin Nodwell** finished his first term as Chair and took a sabbatical leave during the second half of the year, with **Walid Houry** presiding as Acting Chair in his absence.

In July, faculty member **Jean-Philippe Julien**, along with **Vivian Saridakis** from York University, organized a symposium to honour **Emil Pai**, who retired from the Biochemistry Department earlier this year. The symposium featured presentations by former Pai lab members and a Connell Lecture by friend and colleague Greg Petsko from Cornell University. Emil will continue working on some collaborative projects, but he is also looking forward to spending more time with his family.



From left to right: Vivian Saridakis (York University), Justin Nodwell, Emil Pai, Oliver Ernst, Peter Lewis, Reinhart Reithmeier, and J.-P. Julien.

The Director of our graduate professional development (GPD) program, **Dr. Nana Lee**, continues leading GPD seminars, workshops and consultations at national meetings and with other institutions. Some highlights for 2018 include University of Calgary, University of Alberta, American Society of Biochemistry and Molecular Biology, Canadian Society of Pharmaceutical Sciences, and American Association of Medical Colleges - Graduation Research, Education and Training Conference, and Science to Business Edmonton Chapter. She is directing the third year of faculty development workshop series and has spearheaded and implemented the first cohort of an innovative Ph.D. Leaders Program at the Faculty of Medicine, University of Toronto.

Awards:

We are happy to report that **Lewis Kay** was awarded the 2018 Gerhard Herzberg Canada Gold Medal by NSERC. This prize is awarded annually for both the sustained excellence and overall influence of research work conducted in Canada in the natural sciences or engineering. His research focusses on improving Nuclear Magnetic Resonance (NMR) spectroscopy, the technology



Lewis Kay

We are please to report that **Hue Sun Chan** was as chosen as the 2019 Fellow of the Biophysical Society of Canada. Hue Sun was also elected as Program Co-chair of the Intrinsically Disordered Protein (IDP) subgroup of the Biophysical Society (U.S.). He will help organize a meeting to be held Saturday, March 2, 2019 in Baltimore, Maryland.



Hue Sun Chan

We are also happy to announce that **Alan Davidson** was awarded a Tier 1 Canada Research Chairs, while **Joel Watts**, **Haley Wyatt**, and **Trevor Moraes** were awarded Tier II CRCs.



Canada Research Chairs (L to R), Alan Davidson, Joel Watts, Haley Wyatt, and Trevor Moraes

used to capture images of proteins within human cells. Thanks to Kay's innovations, we are taking pictures of larger, more complex proteins than ever before, and actually watching them in motion. This is revealing important clues about fundamental questions in physics, chemistry and biology.

Walid Houry will be co-organizing two upcoming meetings: the inaugural "Proteostasis Researchers in Canada" meeting, which will be held in Toronto, June 10-11, 2019 (<https://www.fourwav.es/view/886/info/>), and the Keystone Symposia conference on "AAA+ Proteins: From Atomic Structures to Organisms" in Granlibakken Tahoe, Lake Tahoe, California, January 26–29, 2020.

Oliver Ernst and Leonid Brown (University of Guelph) organized the 18th International Conference on Retinal Proteins, 24-29 September 2018, Hockley Valley Resort, Ontario.

Graduate Student **Shawn Xiong** was this year's recipient of the Teaching Assistants' Training Program award at the University of Toronto, the second time in two years this prestigious award has been given to a TA involved in the undergraduate course BCH210H: Biochemistry I. Congratulations to Shawn!

Promotions:

Congratulation to **Alex Ensminger**, **Gregory Fairn** and **Roman Melnyk** who were promoted to the rank of Associate Professor, and to **Walter Kahr** and **Aleixo Muise** who were promoted to Full Professor.

Research highlights:

A chemical defence for bacteria against phage infection (Nature. 2018 564:283-286)

The Maxwell lab, in collaboration with the Nodwell lab, uncovered a chemical anti-phage defence system that is widespread in the bacterial family of *Streptomyces*. These produce three molecules that insert into DNA to block phage replication. This mechanism of anti-phage defence probably has a major evolutionary role in shaping bacterial communities.

Novel small molecule inhibitors of mitochondrial protein degradation (Cell Chem Biol. 2018 25:1017-1030.e9)

The Houry lab uncovered novel compounds that dysregulate the activity of human mitochondrial ClpP protease leading to cell death. These compounds could be developed as novel anticancer reagents.

New drug that disarms a deadly hospital superbug (Nature Communications. 2018 9:5233)

A team led by Roman Melnyk screened thousands of small-molecule drugs to find any that might block the effects of the deadly toxins secreted by *Clostridium*

difficile without affecting the gut bacteria. They found that Niclosamide protected human colon cells from *C. difficile* toxins by preventing their uptake into cells.

New structure of a key malaria protein with blocking antibody (Science. 2018 360:1358-1362)

The Julien lab solved the X-ray structure of a molecule known to be essential for the malarial parasite *Plasmodium falciparum* to go through the sexual stages of its lifecycle, and an antibody known to inhibit its function. The research done by Julien and his team showed what the protein looks like, and how such an antibody binds it to block its function. This information can now be used for vaccine development. In addition, the antibody itself can be used as an intervention when administered to people in malaria-endemic areas, an approach that is called passive immunization. Indeed, a humanized version of this antibody is now in preparation for clinical trials in a malaria-endemic region, which will start to assess how effective this biomedical intervention can be at reducing malaria transmission.

Yeast study reveals clues to maintaining genome size (Journal of Cell Biology. 2018 217: 2445)

The Brown lab implicated the RSC ("remodels the structure of chromatin") complex in helping to duplicate yeast centrosomes (known as the spindle pole body), which helps to pull chromosomes apart during mitosis. This is a novel function for this complex and may explain why mutations in the human version of RSC also lead to spontaneous increase in chromosome number, and have been found in rhabdoid tumours, a highly aggressive form of kidney cancer.

Structure of the glucagon receptor in complex with a glucagon analogue. (Nature. 2018 553:106-110), **Cryo-EM structure of human rhodopsin bound to an inhibitory G protein** (Nature. 2018 558:553-8)

As part of a multi-lab collaboration, the Ernst lab helped to decipher how two related proteins, the light receptor rhodopsin and the glucagon receptor, are regulated in response to ligand binding. This work will lead to new insights into the function of this group of proteins, the G-coupled protein receptors, which are major drug targets.

10,000 PhDs Project (PLoS ONE. 2019 14:e0209898)

Led by our former chair, Reinhart Reithmeier, the 10,000 PhDs Project used publicly-available information to determine the current employment positions of the 10,886 individuals who graduated with a Ph.D. from U of

T in all disciplines from 2000 to 2015. The employment outcome data from the 10,000 (<http://www.sgs.utoronto.ca/about/Pages/10,000-PhDs-Project.aspx>) can assist students in making more informed choices about their own career paths. The major results were summarized in a paper published in PLoS One and were featured in Science Careers (<https://www.sciencemag.org/careers/2019/03/first-us-private-sector-employs-nearly-many-phds-schools-do>).

Departmental events:

Department Retreat

Our third annual Department Retreat was held October 1-3 at Geneva Park in Orillia, Ontario. Our guest speakers were Dr. Jennifer Leeds from Novartis Institutes for BioMedical Research, who spoke to us about her latest efforts in drug development, and Dr. Imogen Coe, Dean of the Faculty of Science at Ryerson University, who spoke about equity, diversity, and inclusion in STEM. The focus of this year's retreat was on the incoming rotation students. Indeed, on the first night faculty members presented a poster session where they chatted up their latest work with all the new students.

Awardees from the retreat included **Yogesh Hooda** (Moraes lab) who received the Centennial Award in honour of Sela Cheifetz (top Ph.D. student beyond year 3), **Scott McAuley** (Nodwell lab) who captured the David A. Scott Award (best all-round BCH graduate student), **Nero Thevakumaran** who received the Most Outstanding Ph.D. Thesis award, and **Olesia Ivantsiv** (Davidson lab) who earned the Top T.A. award. Publication awards were given to **Matthew McCallum** (Howell lab) who received the Connell award for the best first author publication for 2017 by a graduate student (McCallum et al., The molecular mechanism of the type IVa pilus motors. Nature Comm. 2017 8:15091) and to **Yi-Hsuan Lin** (Chan lab) who received the Connell award for the best first author publication for 2017 by a post-doctoral fellow (Lin et al., Phase separation and single-chain compactness of charged disordered proteins are strongly correlated. Biophys. J. 2017 10:2043-46). Other awardees included **Kyla Germain** (Kim lab), **Lucie Zhu** (Wilde lab) for best posters by M.Sc. students; **Kathleen Orrell** (Melnik lab), **Taylor Sicard** (Julien lab), **Nicolas Demers** (Kim lab) for best posters by Ph.D. students; and **Thiago Seraphim** (Houry lab) for best post-doctoral fellow poster.



Yogesh Hooda, winner Sela Cheifetz Award, and Walid Houry

Walid Houry and Scott McAuley, winner of the David A. Scott award



Walid Houry and the poster awardees: Thiago Seraphim (post-doctoral fellow, Houry lab), Nick Demers (Ph.D., Kim lab), Kyla Germain (M.Sc., Kim lab), Taylor Sicard (Ph.D., Julien lab) and Kathleen Orrell (Ph.D., Melynky lab)

Golf Day

This year's Golf Day, which took place on June 27th, dawned bright and sunny with a cool breeze that was perfect for our Departmental tournament. A record 32 biochemists (and a sprinkling of Immunologists) headed out to the little-known jewel of mid-town Toronto – the Flemington Park 9-hole Golf Course. Each team had its share of beginners and ringers playing a "best ball" format that allowed everyone to contribute to their team. The competition was fierce but the ERADicals managed to hold onto their title, squeaking out a win over the Dead Ringers who were close behind. A great time was had by all!



Golf Day participants 2018

University of Toronto

Department of Cell and Systems Biology

Correspondent: Neil MacPherson

Cell and Systems Biology at the University of Toronto has had a great year, with significant investments in modernized teaching spaces, updated research laboratories and in strengthening our state-of-the-art imaging facility. After over half a century, we have new animal research support facilities and have plans in the works to enhance and expand our plant growth facilities.

Faculty news:

In 2018, **Professor Melanie Woodin** was appointed as inaugural Vice-Dean, Interdivisional Partnerships. In this role she is responsible for the development, implementation and ongoing monitoring of the faculty's interdivisional relationships and partnerships. Professor Woodin's leadership and excellence in research, graduate mentoring, graduate training, undergraduate teaching, and service resulted in her appointment as **Dean of Arts and Science** starting July 1, 2019. You can read more about her neuroscience research in Cell and Systems Biology, and her plans for the faculty at <https://uoft.me/DeanWoodin>.



Melanie Woodin

Professor Dinesh Christendat was promoted to full Professor this year. His work focusses on molecular reconstruction of proteins to understand their evolution and functional diversification in metabolic pathways. Professor Christendat's group utilizes protein engineering coupled with structural biology to investigate the evolution

of shikimate pathway enzymes. In plants, the pathway produces a precursor for anthocyanins, flavonoids and isoflavonoids, which are potential antioxidants



Dinesh Christendat

with nutritional benefits to humans. The shikimate pathway is an attractive target for drug development because it is absent in humans, but is essential for the survival of microbial organisms including *Plasmodium falciparum*, which causes malaria, and *Toxoplasma gondii*, implicated in psychological disorders and toxoplasmosis.

Professor Chris Garside was promoted to **Associate Professor**, Teaching Stream. He uses this position to create an interactive environment where students are given the opportunity to take risks and question accepted theories, leading to the development of critical thinking that inspires an enthusiasm for learning. Professor Garside is dedicated to investigating and incorporating the best ways to train TAs in order to facilitate the engagement of our undergraduate students in laboratories. You can discuss his research with him and learn about new pedagogical approaches locally at U of T, provincially at oCUBE (Ontario Consortium of Undergraduate Biology Educators), and internationally at ABLE (Association of Biology Laboratory Education).



Chris Garside

Professor Ashley Bruce has been appointed Director of the Human Biology Program, the largest undergraduate life science program at U of T. HMB programs, which range from Global Health to Neuroscience, enable students to delve into the interdisciplinary field of human biology and specialize in their selected area of inquiry.



Ashley Bruce

CSB at the forefront of computational research:

CSB plant scientists address Big Data challenges of large scale plant ecosystem/phenotype/genotype data.

Professor Nicholas Provart and collaborators from Saskatchewan, B.C. and Québec will help to winnow the abundant harvest of crop data for useful traits through a Genome Canada grant “From ePlants to eEcosystems” as part of the Bioinformatics and Computational Biology (B/CB) competition. Read more at <https://uoft.me/ProvartBCB>

Exploiting broad range resistance genes that could protect crops against multiple pathogens, reduce losses and increase yield. **Professor David Guttman** was recently awarded \$2 million in funding from the Genomic Applications Partnership Program (GAPP) of Genome Canada to develop broad-range disease resistance in greenhouse vegetables.

CSB Research Day:

CSB Research Day was held on May 5th, 2018. A morning of fascinating talks was followed by a poster session where students presented all their detailed work. Awards from Research Day and for excellence over the year were presented during the concluding dinner party.

The inaugural Rustom H. Dastur Scholarship to support students pursuing studies in botany was awarded to **Ahmad Hasan** (Ness Lab). This scholarship was bequeathed by Renate Dastur in honour of her late father-in-law, a plant physiologist who, among other research, undertook a pioneering study on the effect of blue-violet rays on photosynthesis in 1935.



Research Day

CSB awards were presented for the Valerie Anderson Award to **Ahmed Hamam** (Kronzucker lab), Kenneth C. Fisher Fellowship to **Amir Arellano Saab** (McCourt

lab), Sheila Freeman Award to **Dennison Trinh** (Nash lab), Dr. Clara Winifred Fritz Memorial Fellowship to **Derek Seto** (Desveaux lab), Duncan L. Gellatly Memorial Fellowship to **Taraneh Zarin** (Moses lab), Yoshio Masui Prize in Developmental, Molecular or Cellular Biology to **Nicholas Guilbeault** (Thiele Lab), David F. Mettrick Fellowship to **Rida Ansari** (Thiele Lab), Dr. Klaus Rothfels Memorial Scholarship to **Sherin Mohammed Shibin** (Rhee lab), Senior Alumni Association Prize to **Trisha Mahtani** (Treanor lab), Hilbert and Reta Straus Award to **Stuart Macgregor** (Goring lab), Vietnamese-Canadian Community Award to **Annik Yalnizyan-Carson** (Richards lab), Elizabeth Ann Wintercorbyn Award to **Choden Shrestha** (Lovejoy lab) and **Sonhita Chakraborty** (Yoshioka lab), Ramsay Wright Scholarship to **Arthur Cheng** (Cheng lab), Zoology International Scholarships to **Casey Read** (Lovejoy lab) and **Tatiana Ruiz Bedoya** (Guttman lab), Zoology Sesquicentennial Award to **Steven Chen** (Chang lab), Alfred and Florence Aiken and Dorothy Woods Memorial Scholarship to **Afif Aqgrabawi** (Kim lab), Joan M. Coleman Scholarship to **Anna Van Weringh** (Provart lab) and the Sherwin S. Desser Scholarship to **Alexander Myrka** (Buck lab).

CSB public engagement:

CSB had an engaged and enthusiastic team to host our booth at the annual *Science Rendezvous 2018* street festival on St. George Street. We presented models of plant and animal cells, showed fly mutants and exhibited plant pathogens. Visitors ranged from elementary students eager to learn about the inner workings of the cell, through high school students looking to choose a program, and on to curious alumni of all ages. This year's Science Rendezvous will take place on May 11th; please visit us in Toronto or go to any of the other Science Rendezvous events around Canada: <https://www.sciencerendezvous.ca/>.



Science Rendezvous 2018

In addition to our presence at Science Rendezvous, CSB also supports the activities of *Let's Talk Science* (<http://letstalkscience.ca/>) and *iGEM Toronto* (<https://igemtoronto.ca/>). **Professor Belinda Chang** also hosted high school students during March Break as part of *Step into STEM*.

Professor John Peever spoke about his research into the neurobiology of sleep on *The Agenda* from TVO. The video can be found here: <https://tvo.org/video/programs/the-agenda-with-steve-paikin/a-good-nights-sleep>. Professor Peever aims to understand the mechanisms underlying behavioural arousal states (e.g., wakefulness, REM sleep, non-REM sleep) and the mechanistic changes that occur in sleep disorders such as narcolepsy and REM sleep behaviour disorder. Professor Peever was also the guest in a FutureTech Health Podcast on "Understanding the Restorative Nature of Sleep". Links to the podcast can be found at <http://uoft.me/PeeverPodcast>

Research:

Recent high profile papers from CSB researchers include: A cargo model of yolk syncytial nuclear migration during zebrafish epiboly. Fei Z, Bae K, Parent SE, Wan H, Goodwin K, Theisen U, Tanentzapf G, **Bruce AEE**. *Development* 146 (2019). This was accompanied by a post of movies collected for the paper, which can be found at <https://youtu.be/RCurLXSvwl5>

Single-cell analysis uncovers convergence of cell identities during axolotl limb regeneration. Gerber T, Murawala P, Knapp D, Masselink W, Schuez M, Hermann S, Gac-Santel M, Nowoshilow S, Kageyama J, Khattak S, **Currie JD**, Camp JG, Tanaka EM, Treutlein B. *Science* 362 (6413) (2018)

Oxidative stress orchestrates cell polarity to promote embryonic wound healing. Hunter MV, Willoughby PM, **Bruce AEE**, **Fernandez-Gonzalez R**. *Dev Cell*. 47:377-387 (2018)

KLF4 nuclear export requires ERK activation and initiates exit from naive pluripotency. Dhaliwal NK, Miri K, Davidson S, Tamim El Jarkass H, **Mitchell JA**. *Stem Cell Reports* 10:1308-1323 (2018)

Collision of expanding actin caps with actomyosin borders for cortical bending and mitotic rounding in a syncytium. Zhang Y, Yu JC, Jiang T, **Fernandez-Gonzalez R**, **Harris TJC**. *Dev Cell* 45:551-564 (2018).

University of Toronto

Department of Molecular Genetics

Correspondent: Barbara Funnell

First, we would like to announce that in 2019 the Department of Molecular Genetics will be 50 years old! From the Department of Medical Cell Biology founded by Dr. Louis Siminovitch in 1969, and after several name changes and a merger with the former Department of Microbiology, we became Molecular Genetics. We have expanded to over 100 faculty members, three graduate programs (over 350 M.Sc./Ph.D. students, 6 students in the M.Sc. in Genetic Counselling, and 15 students in the M.H.Sc. in Medical Genomics), and approximately 220 undergraduates in the Molecular Genetics and Microbiology Specialist and Major (MGY) programs. A major initiative begun in 2018 is the planning of our anniversary celebrations. We will hold a scientific symposium for alumni and our current community to highlight past and present science on May 31, 2019 at the Carlu in downtown Toronto. Two eminent former faculty members are keynote speakers, Dr. Lap-Chee Tsui (Zhejiang University) and Dr. Roderick McInnes (McGill University), and the rest of the day will be filled with talks by Ph.D. alumni in various scientific careers. We are extremely excited to reunite the members of our community and share in the history and accomplishments of the department!

Education updates:

M.H.Sc. in Medical Genomics

In September 2018 we launched the M.H.Sc. in Medical Genomics, which is first of its kind in Canada. We accepted 15 students from diverse backgrounds for our inaugural class, who are now in the middle of their first year of study. The program teaches practical and theoretical aspects of modern genetics and genomics with a strong focus on clinical application. Students graduating from the program will obtain professional and practical skills that will help situate them in a world in which genetic and genomic data are routinely collected and analyzed across a wide range of patient populations and medical indications.

International Doctoral Cluster initiative

The department has been deeply committed to forging global research alliances with world-class graduate institutions. Our most recent International Doctoral

Cluster (IDC) for the Joint Institute of Genetics and Genome Medicine between the University of Toronto and Zhejiang University in China enrolled our first student in 2018. **Charmaine Rodrigues** will be jointly co-supervised by Dr. C.C. Hui and Dr. Xi Huang in MoGen, and Dr. Min-Xin Guan at Zhejiang. Charmaine is studying the role of mitochondria-associated ion channels in medulloblastoma, the most aggressive childhood brain cancer.

Welcome to new faculty:

Dr. Yun Li is a Scientist in the Developmental and Stem Cell Biology program at the Hospital for Sick Children, and recently joined the Department as an Assistant Professor. She received her Ph.D. at the University of Texas Southwest Medical Center, and her post-doctoral training with Rudolf Jaenisch at the Whitehead Institute at the Massachusetts Institute of Technology. Dr. Li's research aims to understand how the human brain forms, what makes it unique from that of other species, and how disorders like autism impact its development and function.



Yun Li

Dr. Julien Muffat is a Scientist in the Neurosciences and Mental Health program at the Hospital for Sick Children, and has recently joined the Department as an Assistant Professor. Dr. Muffat received his Ph.D. from the California Institute of Technology, and completed



Julien Muffat

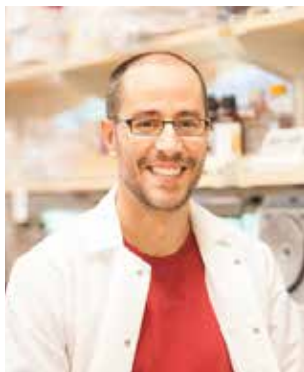
his post-doctoral training with Rudolf Jaenisch at the Whitehead Institute at the Massachusetts Institute of Technology. His laboratory studies interactions of the nervous and immune systems, with a focus on understanding the role of the resident innate immune cells of the brain, microglia, in neurological and psychiatric disorders.

Dr. Stephanie Protze is a Scientist at the McEwen Stem Cell Institute at the University Health Network, and recently joined the Department as an Assistant Professor. She received her Ph.D. at the University of Dresden, and her post-doctoral training with Gordon Keller at the McEwen Centre for Regenerative Medicine at UHN. Dr. Protze's research focusses on heart development and on advancing new regenerative therapies to treat cardiovascular disease.



Stephanie Protze

Dr. Miguel Ramalho-Santos is a Senior Scientist at the Lunenfeld-Tanenbaum Research Institute and an Associate Professor in Molecular Genetics. He received his Ph.D. at Harvard University, and then was a UCSF Fellow at the University of California-San Francisco, where he became an Assistant Professor in 2007. He recently moved to Toronto to become the *Canada 150 Research Chair in Developmental Epigenetics* at LTRI. His lab studies the epigenetic regulation of stem cell pluripotency using the latest techniques in stem cell biology, embryology, molecular biology, functional genomics and bioinformatics.



Miguel Ramalho-Santos

Dr. Philipp Maass is a Scientist in the Genetics and Genome Biology program at the Hospital for Sick Children, and has recently joined the Department as an Assistant Professor. He completed his Ph.D. at the Humboldt University Berlin, Max Delbrück Center for Molecular Medicine, and his post-doctoral training at Max Delbrück Center for Molecular Medicine and Harvard University. The Maass lab studies inter-chromosomal interactions and how they



Philipp Maass

regulate gene expression, with particular focus on those of the non-coding genome that impact development and disease mechanisms.

Retirement:

Dr. Andrew Bognar retired on July 1, 2018. Andy was with the University of Toronto for 33 years, from Microbiology, to Medical Genetics and Microbiology, to Molecular Genetics. Andy's research interests concerned folate metabolism, the enzymatic mechanisms of folylpolyglutamate synthetase in bacteria, and one-carbon metabolism in yeast. Andy also served an important role for the University, as the Chair of the University of Toronto Biosafety committee for over 10 years. We wish him all the best and an extremely restful and happy retirement.



Andrew Bognar

Faculty highlights and awards:

Dr. Lewis Kay has been awarded the *2018 Gerhard Herzberg Canada Gold Medal*, Canada's highest honour for science and engineering. The prize, which is accompanied by \$1 million in grant funding, recognizes his role in improving nuclear magnetic resonance (NMR) spectroscopy, technology that elucidates the molecular structure of proteins and other macromolecules within cells.



Lewis Kay

Dr. Jeffrey Wrana has been awarded the *2018 McLaughlin Medal* by the Royal Society of Canada. The medal is awarded for important research of sustained excellence in medical sciences, and is one of just 12 research awards the society granted this year. Jeff was nominated for his seminal discovery of the TGF-beta signal transduction system and its contribution to our understanding of biology, human disease and its treatment.



Jeffrey Wrana

Canada Research Chairs

Nine faculty members from Molecular Genetics were awarded Canada Research Chairs in 2018:

Dr. Amy Caudy - Tier 2 Canada Research Chair in *Metabolomics for Functional Enzyme Discovery*.

Dr. Brian Ciruna - Tier 1 Canada Research Chair in *Developmental Genetics and Disease Modelling*.

Dr. Leah Cowen - Tier 1 Canada Research Chair in *Microbial Genomics and Infectious Disease*.

Dr. Alan Davidson - Tier 1 Canada Research Chair in *Bacteriophage-Based Technologies*.

Dr. Daniel Durocher - Tier 1 Canada Research Chair in *Molecular Genetics of the DNA Damage Response*.

Dr. Xi Huang - Tier 2 Canada Research Chair in *Cancer Biophysics*.

Dr. Laurence Pelletier - Tier 1 Canada Research Chair in *Centrosome Biogenesis and Function*.

Dr. Michael Wilson - Tier 2 Canada Research Chair in *Comparative Genomics*.

Dr. Mei Zhen - Tier 1 Canada Research Chair in *Neural Circuit Development and Function*.

Trainee awards:

Eesha Sharma (Blencowe lab) has been awarded a 2018 Jennifer Dorrington Award, for her studies on non-coding RNAs and RNA-RNA interactions at the genomic level. The award was established in 2006 as a tribute to Dr. Jennifer Dorrington, who was a professor in the Banting and Best Department of Medical Research.

Molecular Genetics also has several competitive awards and fellowships, given annually or biannually to our graduate students. Congratulations to all recipients! They are:

Kristina Stzanko (Davidson lab): L.W. Macpherson Award

Kento Abe (Gingras lab): Roman Pakula Award

Ellen Langille (Schramek lab): Hannah Farkas-Himsley and Alexander Himsley Memorial Prize

Dmitri Segal (Taipale lab): Norman Bethune Award

Amit Weiner (Gray-Owen lab): Eric Hani Fellowship

Departmental and community events:

Farewell with many, many thanks, Iliana!

Iliana Sztainbok, our MoGen Graduate Program Administrator, moved this summer to the position

of Graduate Programs Administrator in the Faculty of Music. Iliana joined MoGen in 1998, and has kept our graduate program running smoothly for over 20 years. Her commitment and dedication played an important role in the success of the graduate program in the Department of Molecular Genetics. We wish Iliana every success in her new role.



Iliana Sztainbok

4th Annual MoGen Career Development Symposium

Empowering trainees and engaging alumni are our primary goals for the Career Development symposia series started in 2015. The 4th Annual MoGen Career Development Symposium was held on June 4, 2018, at the Chestnut Conference Centre, organized by **Drs. Leah Cowen** and **Barbara Funnell**. The mission of our symposia is to provide mentorship for our trainees in the many career options available to them by highlighting the paths followed by the many extraordinary alumni from Molecular Genetics. The afternoon included round-table discussions between alumni and trainees, networking sessions, and a panel discussion by six distinguished alumni:

- Dr. Masha Cemma (Policy Advisor, Office of the Chief Science Advisor of Canada)
- Dr. Blair Gordon (Director of Development, Edesa Biotech)
- Mr. Douglas Hamilton (President and CEO, MetaStat Inc.)
- Dr. Pamela Kanellis (Senior Director, Canadian Institute for Advanced Research)
- Dr. Liz Patton (Professor and MRC Programme Leader Scientist, University of Edinburgh)
- Dr. Anthony Vecchiarelli (Assistant Professor, University of Michigan)

In 2019 we will incorporate a Career Development Workshop into the 50th Anniversary Symposium (see above). Our next (5th) Career Development symposium will be in 2020. Stay tuned!

MoGen Retreat 2018

We have been meeting for an annual Department Retreat for over 20 years. This year we met at the Geneva Park YMCA on Lake Couchiching, in Orillia, Ontario, on

September 19-21. The retreat was organized by **Drs. Julie Lefebvre, Daniel Schramek, and Leah Cowen**, with the assistance of **Kali Iyer, Amanda Charlesworth, Ellen Langille**, and their GSA team. The retreat kicked off on Wednesday evening with Power Hour night, a recruitment event for first year graduate students and faculty, followed by the main retreat at which all trainees and faculty are invited. Attendance was great, with over 250 attendees. The retreat showcases research from across the entire department, and includes short faculty talks and posters from trainees. We capped off our day with a fantastic line-up of dinner entertainment organized by the GSA. The celebrations went into the night at the fire pits, and with music and dancing in the Barn. Another successful year!



Participants at the MoGen retreat 2018

Graduate student events

The GSA organizes several events every year to entertain and inform our graduate community. In this newsletter, we highlight several that were held in 2018 and designed to introduce Toronto to our international students. These students were given first crack at the signup sheet, and then the events were open to all. Our first activity was a stroll through High Park to welcome the annual cherry blossoms bloom on May 13. Both international and domestic students came out to bid winter's end by enjoying some picnic food kindly provided by the GSA, friendly frisbee tosses, and the all-around nice weather. Other events included a potluck picnic on Toronto Islands at the end of the summer, and an outing in the fall to "Friday Nights Live" at the Royal Ontario Museum to view the dazzling array of galleries accompanied by sumptuous food and drinks.



Grad students admiring the cherry blossoms in High Park

A major initiative organized and run by our graduate students is the Career Development Program. The program is designed to help trainees identify and achieve their career goals through a series of workshops and networking events that each focus on distinct career options accessible to life sciences trainees. In 2018, the career development team hosted 6 events, on topics ranging from intellectual property, to entrepreneurship, to science and art. These workshops are always very well attended, and we are delighted that our students take such an active role in career options for our graduates!

University of Toronto Mississauga

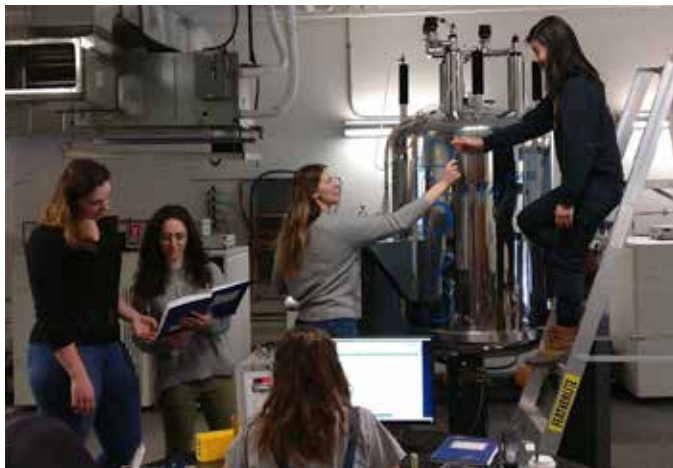
Department of Chemical and Physical Sciences

Correspondent: Voula Kanelis

Voula Kanelis and her group study ABC proteins and HNH endonucleases. Highlighted activities from the year include: **Sasha Weiditch's** successfully defended her Ph.D. thesis, M.Sc. student **Sarah Bickers** was awarded an NSERC CGS-M, undergraduate student **Tetyana Murdza** obtained an NSERC USRA, and undergraduate **Agatha Tymczak's** 4th year project oral presentation tied for first place! The Kanelis lab also welcomed **Jonathan Sayewich**, an M.Sc. student in the group who is using his knowledge of computational studies to calculate protein/drug structures from NMR data.

Voula Kanelis has continued her involvement in the Amgen Biotech Experience program, along with co-director Professor Steven Chatfield (UTM Biology) and site coordination and technician Kristina Han. Together, they

have provided hands-on biotech lab experience to over 30 schools and more than 1,500 students in the two years the program has been running.



Female NMR spectroscopist trainees from the Kanelis and Prosser labs on the International Day of Women and Girls in Science

David McMillen has been investigating ways to bring biology-based solutions to problems in low-resource settings. He was recently awarded a Connaught Global Challenge Award titled “Innovating for the global south: accelerating the impact of synthetic biology on health”. The award will bring together faculty from across the university - Professors Goh, Sa, Pardee, and Chockalingam, from Chemistry, Education, Pharmacy, and Public Health - to investigate the scientific and public-policy questions associated with creating locally-appropriate synthetic biology solutions to improve people’s health. This could include low-cost methods of detecting disease using cells or cell-free extracts, or just-in-time therapeutic or vaccine production using microbes for biosynthesis. The award will also fund the direct participation of international stakeholders, so that we can begin to understand the on-the-ground needs in our target locations.

Congratulations to **Chris Di Pietrantonio** and **Jerome Gould** in **Scott Prosser’s** lab on completing their recent M.Sc. theses. Jerome is off to industry and Chris has been admitted to a new digital health program. Congratulations to **Dmitry Pichugin** who has officially repaired his 11th turbo pump. **Chris, Kate Huang, Advait Hasabnis,** and **Alex Oraziotti** presented their results recently in Dublin, Ireland. Chris was so profoundly impressed by Guinness beer that he has started brewing stout at home, for testing on Friday afternoons. Kate thinks she now understands cholesterol allostery, and **Keith Taverner** thinks the Bruins will go all the way in the Stanley Cup.

For one of these two, it’s a matter of wishful thinking. Welcome to **Jacob van Reet** and **Geordi Frere** as they become fully-fledged graduate citizens of the lab.

Sarah Rauscher and colleagues continue their research in the development of accurate and efficient simulation methods to study intrinsically disordered proteins and protein dynamics in all-atom detail. Please see <https://www.utm.utoronto.ca/cps/faculty-staff/rauscher-sarah> for more information. Professor Rauscher joins other UTM colleagues on the organizing committee for the Biophysical Society of Canada annual meeting, which will be held at UTM in late May 2019.

Jumi Shin published a review article in *Peptide Science* on “Peptide therapeutics that directly target transcription factors.” Her research group is also continuing to use their phage-assisted directed evolution system to refine the proteins that inhibit transcription factors involved in cancer and, more recently, asthma. For more information of the Shin lab, please see: <https://www.utm.utoronto.ca/~shinjumi/index.html>.

Andrew Beharry’s research is at the interface of biochemistry and medicinal chemistry, with the aim of developing tools for cancer diagnostics and treatment. For more information on the Beharry group, please see: <http://www.beharrylab.com>.

Patrick Gunning and his group continue to make strides in the generation of drugs against cancer. For more information on the Gunning group, please see: <http://www.gunninggroup.ca/home>.

University of Toronto Scarborough

Department of Biological Sciences

Correspondent: Rongmin Zhao

The Department of Biological Sciences at the University of Toronto Scarborough campus currently has 32 full-time core faculty members. Most of our faculty are also cross-appointed to the Department of Cell and Systems Biology (CSB) and/or the Department of Ecology and Evolutionary Biology (EEB) at the St. George campus. Our labs focus on research at molecular, organismal, and ecological levels, and house most of the graduate students on the campus.

New faculty:

The department has been rapidly growing in recent years with three searches currently in progress. Last year, two plant biologists, **Drs. Adam Mott** and **Eliana Gonzales-Vigil**, joined the Department as assistant professors. Dr. Gonzales-Vigil has been trained in lipid biochemistry. She is interested in the origin of some specialized plant secondary metabolites, particularly in poplar trees. Her lab will study the role of those metabolites in nature, and the mechanism by which they exert toxicity or repellency, thus shaping the acquisition of new traits for plants. Dr. Mott is a plant systems biologist interested in plant-pathogen interactions, and the roles that plant cell surface receptors play in those interactions. His lab combines high-throughput techniques and computational analyses to understand how receptors integrate biotic and abiotic signals to regulate immunity, growth, and development.



Adam Mott

Eliana Gonzales-Vigil

Faculty awards and recognition:

In 2018, **Dr. Bebhinn Treanor**, who studies B-lymphocyte receptors and teaches the core immunology course on campus, has been granted tenure and promoted to Associate Professor, and **Dr. Nathan Lovejoy** was promoted to the rank of Professor. **Dr. Nick Mandrak** received the Loftus Award, for his distinguished scientific contributions toward understanding the healthy ecosystems of the Great Lakes. **Dr. Christina Guzzo**, who is interested in the molecular mechanisms of HIV-1 control and pathogenesis, received a John R. Evans Leaders Fund award from the Canada Foundation for Innovation. **Dr. Blake Richards** received an Early Researcher Award from the Ontario Ministry of Research, Innovation and Science. Three other PIs (**Drs. MacIvor, Manson and Terebiznik**) received their NSERC Discovery Grants. Particularly, **Dr. Mauricio Terebiznik** received the Discovery Accelerator Supplements fund to boost his research in phagocytosis.

Graduate student news:

Our graduate students at Scarborough campus also had a great year in 2018. Four master students received NSERC CGSM or OGS Awards. Two Ph.D. graduate students, **Nicholas Guilbeault** (Dr. Thiele lab) and **Dennison Trinh** (Dr. Nash lab), received the NSERC PGSD scholarship. In the same year, **Nicholas Guilbeault** also received the Yoshio Masui Prize in developmental, molecular and cellular biology for his study of zebrafish in neuronal control of their natural ethological behaviours. **Dennison Trinh** received the Sheila Freeman Graduate Award in Zoology. Another student, **Ahmed Hamam** (Dr. Kronzucker lab), won the Valerie Anderson Award, which is given to an outstanding graduate student in the discipline of Plant Biology.

University of Victoria

Department of Biochemistry and Microbiology

Correspondent: Perry Howard

Faculty news:

Dr. Caroline Cameron won the Genome BC Award for Scientific Excellence in April 2019. She is also the Chair of the 23rd biennial meeting of the International Society for Sexually Transmitted Diseases Research taking place in Vancouver in summer 2019. In April 2018, Dr. Cameron was awarded a patent for a potential vaccine against syphilis.



Dr. Caroline Cameron (photo courtesy of Uvic Photo Services)

Department news:

Phase 1 of Petch building renovations is now (mostly) complete, providing upgraded laboratory space for five researchers in the department. These laboratories offer open concept spaces with improved space use efficiencies and separate areas for wet lab and desk work,

while meeting all laboratory safety requirements. The second year Microbiology teaching laboratories were also renovated and now provide a bright, safe and professional space for undergraduate students to explore the world of microorganisms.

The department's undergraduate teaching laboratory staff has moved through some big changes this past year. The Senior Laboratory Instructors, **Mr. Glen Pryhitka** and **Ms. Barb Currie**, both retired after spending over 40 years each teaching undergraduate students the hands-on techniques of biochemistry and microbiology. Glen and Barb were key players in developing the undergraduate laboratory program.

Dr. Stephen Redpath and **Ms. Adrienne White** have moved into those leadership roles. Their combined years of experience in research and teaching will ensure the laboratory program maintains its stellar reputation while staying current with cutting edge research.

University of Waterloo

Department of Biology

Correspondent: *Bernie Duncker*

Faculty comings and goings:

2018 was a great year for faculty renewal in Biology at the University of Waterloo, with two new colleagues joining our Department. **Dale Martin** studies molecular mechanisms that promote the clearance of disease-causing proteins in neurodegeneration, including Huntington disease and amyotrophic lateral sclerosis (<https://uwaterloo.ca/martin-lab/>), while **Julie Messier** is a plant functional ecologist interested in the causes and consequences of trait variation and integration across biological scales, from within individuals to among communities (<https://juliemessier.org>).



Dale Martin

Julie Messier

Along with new arrivals, came the retirement of one of our most esteemed colleagues, **John Heikkila**, a world expert on heat-shock proteins. John held a Canada Research Chair in Stress Protein Gene Research, was an Associate Dean of Science for Graduate Studies and Research and was also a long-serving NSERC Discovery Grant panel Chair.

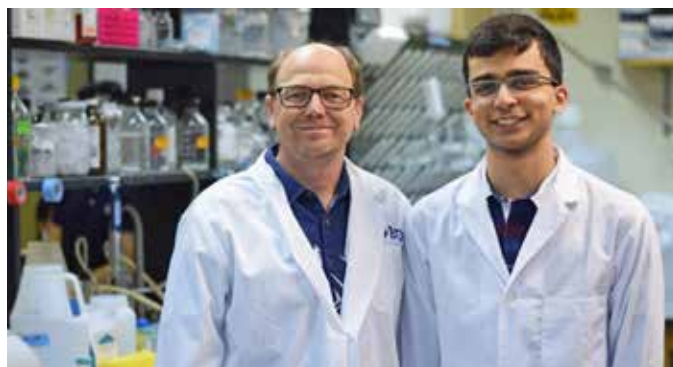
Faculty awards and recognition:

UW Biology faculty members were the recipients of numerous honours in 2018. **Andrew Doxey** was the inaugural UW Science Excellence in Early Career Research Award (SEECRA) winner, and also received the Thermo Fisher Scientific Award at the annual Canadian Society for Microbiologists conference, while **Mark Servos** was appointed a 2018 Fellow of the Society of Environmental Toxicology and Chemistry (SETAC).

Finally, the future looks bright, with the news that local high school student **Sajeev Kohli**, who was mentored by Biology Professor **Brian Dixon** and Chemical Engineering Professor **Pu Chen**, won the 2018 International BioGENEius Challenge held in Boston, for his project which improves the targeting ability of nanoparticles used in delivering cancer medication.



Andrew Doxey



Brian Dixon (L) with Sajeev Kohli (R)

CSMB-Sponsored Events 2018

Graduate events

The CSMB provides financial support to graduate student societies for a variety of activities related to biochemistry, molecular biology, cell biology or genetics. Examples of supported activities include (but are not restricted to) the following:

Scientific Symposium Days, with invited scientists speaking on subjects in the areas of biochemistry, molecular biology, cell biology or genetics.

Student Research Conferences, where students display their research as posters, or give oral presentations.

Career Fairs or Career Workshops in areas related to biochemistry, molecular biology, cell biology or genetics.

*The society will support **up to six** events each year, to a **maximum of \$500** per event, on a competitive basis. Student organizations seeking financial support under this program should contact the society Secretary with a short description of the planned event, and the amount of funding requested. The request should also include a Regular Member of the Society as a Sponsor/Coordinator, working with the Student Organization. Requests will be accepted twice each year (up to 3 possible awards for each competition), with deadlines of **February 15** and **September 15**.*

McGill University

Annual McGill Biomedical Graduate Conference (AMBGC)

Correspondent: Nida Haider

The AMBGC is one of the largest student-run research symposia in Canada. The symposium offers graduate students engaged in biomedical research across Montreal the opportunity to present their research findings in an encouraging environment. The Experimental Graduate Student Association (EMGSS) aims to provide conference participation opportunities for graduate students from all labs, regardless of budgetary restrictions. In this vein, we remain committed to organizing a high-quality scientific event that does not charge a registration fee for presenters. AMBGC promotes direct communication across diverse research backgrounds and universities; thus, contributing to the advancement of biomedical research in Montreal.

The AMBGC Organizing Committee consisted of: Nida Haider (co-Chair), Alex Cooke (co-Chair), Katarina Pessina, Samantha Bovaird, Rehka Raveendrakumar, Holly Sarvas, Juan-Carlos Padilla and Zeinab Sharifi.

The conference took place on March 22 2018, at McGill University, New Residence Hall, and the conference

themes were: Oncology, Cardiovascular and Respiratory Systems, Endocrinology and Energy Homeostasis, Cellular and Molecular Biology, Genetics and Gene Expression, Microbiology and Immunology, Epidemiology, Bioethics and Clinical Research, and Neuroscience. Overall, 83 abstracts were presented. The 165 conference participants comprised 77 M.Sc., Ph.D. and post-doctoral student presenters, 30 oral and poster presentation judges, 43 attendees, 10 conference organizers and 5 industry representatives.

The Keynote Lecture, entitled “Exercise: New Molecular Discoveries Mediating the Beneficial Effects on Health”, was delivered by an invited speaker, Dr. Laurie J. Goodyear, who is a leader in the field of cellular signalling in skeletal muscle. Dr. Goodyear is a senior investigator at the Joslin Diabetes Center and an Associate Professor of Medicine at Harvard University. Her research focusses on the underlying molecular mechanisms behind the beneficial effects of exercise on health. We were incredibly honoured that she was able to recently join us at AMBGC, to share her research.

Dalhousie University Biochemistry and Molecular Biology Student Research Day

Correspondent: Shannon Sibbald

The 2nd annual Student Research Day in the Department of Biochemistry and Molecular Biology at Dalhousie University took place on Wednesday, November 14th, 2018. This one-day student-led symposium aims to showcase the work of both undergraduate and graduate students across a wide range of biochemistry and molecular biology related research topics, and encourage scientific communication and collaboration between students and faculty across the department. The event also features a seminar from a keynote speaker who is chosen and invited by the graduate students of the department.

This year the focus of the symposium was to improve scientific communication to fellow researchers and the public alike. Throughout the day, students were given various opportunities to communicate their research using different platforms such as a competitive 3-minute thesis style presentation, and by presenting at a poster session. Students and faculty also took part in a workshop (led by our invited speaker, Dr. David Smith, who is also well known for his popular science writing) on communicating in science in formal research articles and via popular science outlets.

The keynote speaker this year was Dr. David Smith from Western University, London, Ontario. His keynote address focussed on the architecture of organelle genomes in green algae, investigating the extensive genome size and content variation between them and the evolutionary forces that made them that way. It was attended by over 75 students, post-doctoral fellows and faculty who thoroughly enjoyed his excellent and engaging seminar.

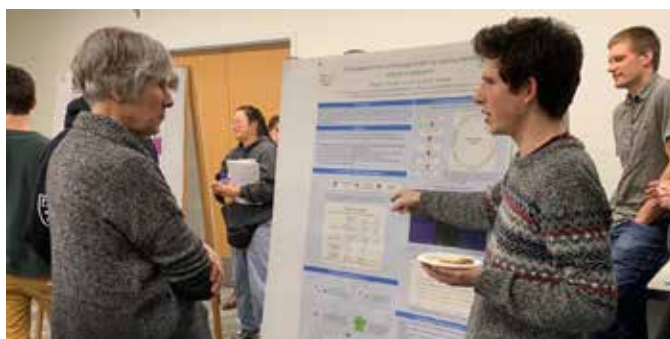
This day was a huge success thanks to the participants, organizers, the keynote speaker Dr. David Smith, and the generous support of CSMB.



Graduate students with the keynote speaker, Dr. David Smith



Students at the poster session



Students at the poster session

Toronto RNA Club Seminar Series Sept-Dec 2018

Correspondent: Eliza Lee

The Toronto RNA Club was started in 2014 by a group of trainees from research institutes across the Greater Toronto Area (GTA) with the goal of bringing together faculty and trainees to discuss their research into RNA biology. Over 250 researchers in the GTA (including the Universities of Toronto, Guelph, and Western Ontario, McMaster University, and York University) study various aspects of RNA biology, ranging from computational biology to gene expression, using many different model systems and tools. The RNA Club is a consistent forum where RNA-related ideas are discussed and new collaborations are forged.

Our monthly seminar series runs from September to June, alternating between trainee, internal, and external faculty talks where presenters highlight their exciting new RNA research. Typically, around 50 researchers attend each month, and this year we have had outstanding talks from new University of Toronto faculty members, Dr. John Calarco and Dr. Hyun Kate Lee, as well as trainees Amanda Charlesworth, Karin Isaev, Eric Wolf and Kevin Ha. All meetings are followed by a pizza-fuelled networking

session where we continue our dialogue about the data presented in the talks. These sessions are also wonderful for community and collaboration-building. Our RNA Club talks introduce new researchers to the vibrant RNA community, and help to stimulate new ideas and approaches to answering questions about RNA biology. We are looking forward to the start of our winter program as we will host our external invitee Dr. Jocelyn Côté (University of Ottawa) in January. We thank CSMB-SCBM for supporting the Toronto RNA Club to continue building a strong community of researchers.



Trainees presenting at the Toronto RNA Club seminar series

Toronto RNA Enthusiasts' Day (TRENd) Symposium 2018

Correspondent: Amanda Charlesworth

Toronto RNA Enthusiasts' Day (TRENd) is a student-led and trainee-focussed scientific forum for a diverse group of RNA researchers in the field. It was held on July 31st, 2018 at the Peter Gilgan Centre for Research and Learning (PGCRL) at The Hospital for Sick Children in Toronto. This year's organizing committee was composed of a group of trainees from across the University of Toronto: Amanda Charlesworth (Ph.D. student, Claycomb Lab, Dept. of Molecular Genetics), Lauren Ostrowski (Ph.D. student, Mekhail Lab, Dept. of Lab Medicine and Pathobiology), Dr. Matthew Hildebrant (post-doctoral fellow, Ellis Lab, Dept. of Molecular Genetics), Nevraj Kejiou (M.Sc. student, Palazzo Lab, Dept. of Biochemistry), Eesha Sharma (Ph.D. student, Blencowe Lab, Dept. of Molecular Genetics) and

Amanda Hall (Ph.D. student, Mekhail Lab, Dept. of Lab Medicine and Pathobiology). Support was provided by faculty mentor, small RNA biologist, Dr. Julie Claycomb (Associate Chair, Dept. of Molecular Genetics).

TRENd is a vital part of our RNA community, as it provides trainees with valuable scientific feedback, encourages new interactions and collaborations, and enables exposure to new ideas. With that in mind, the only non-trainee presentation of the day was our Keynote speaker, Dr. Geraldine Seydoux. The rest of the day consisted of 12 talks and over 40 poster presentations from post-doctoral, graduate and undergraduate trainees, covering a vast swath of RNA biology, including Transcription, RNA Processing, Splicing Regulation and Mechanisms, Small and Non-coding RNAs, RNP, Post-transcriptional Regulation, Translation and the Ribosome, and RNA Structure and Computational methods for RNA Data Analysis. This year, TRENd brought together over 170 scientists from all over the GTA, Ontario, Québec, Ohio, and Western New York.

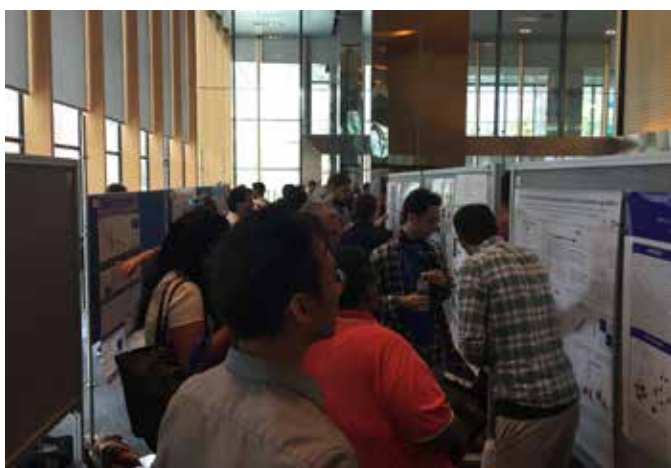
One new addition to the 3rd Annual TRENd was a "Lunch and Learn" seminar run by the University of Toronto Departments of Biochemistry and Immunology's own Dr. Nana Lee (Assistant Professor, teaching stream). This workshop focussed on building personal development plans and identifying methods to develop soft skills that enable you to have a more successful career in the future. Because of the generous support from CSMB, TRENd also awarded prizes for the people's choice best talk, presented by Dalia Ghoneim (Matthews lab, University of Rochester) and judge-selected best posters, by graduate students Matthew Berg (Brandl Lab, University of Western Ontario), Joseph Samuel (Marsden Lab, University of Toronto) and undergraduate student Jimmy Ly (Smibert Lab, University of Toronto).



Audience in the auditorium at the 3rd Annual TRENd



Career development session at the 3rd Annual TREnD



Poster session at the 3rd Annual TREnD

University of Toronto, Department of Medical Biophysics James Lepock Memorial Student Research Symposium

Correspondent: Joseph Longo

The goal of the James Lepock Memorial (JLM) Symposium is to offer a forum for graduate students in the Department of Medical Biophysics at the University of Toronto to come together and discuss the latest research being conducted by students in our varied affiliated institutes. These include the Princess Margaret Cancer Centre, Ontario Institute for Cancer Research, SickKids Hospital, Sunnybrook Health Sciences Centre and the Lunenfeld-Tanenbaum Research Institute. The JLM Symposium is organized by student members of the Medical Biophysics Graduate Student Association.

This year's event was held on May 22 2018, and took place at the Bahen Centre for Information Technology at the University of Toronto. It consisted of two keynote lectures, a poster session and oral presentations by M.Sc. and Ph.D. candidates. Approximately 150 graduate students, post-doctoral fellows, research technicians and faculty members participated in this year's event.

In 2018, our event featured keynote lectures by Dr. John Rubinstein, Senior Scientist at the Peter Gilgan Centre for Research and Learning (SickKids) and Dr. Nimmi Ramanujam, Professor of Biomedical Engineering and Global Health (Duke University).



Scenes from the 2018 JLM Student Research Symposium

Université Laval Journée Scientifique des Étudiants du Centre de Recherche sur le Cancer de Québec et l'Axe Oncologie du CHU de Québec

Correspondent: Jonathan Humbert

La 22ème édition de la Journée Scientifique des Étudiants (JSE) du Centre de Recherche sur le Cancer de Québec et l'Axe Oncologie du CHU de Québec s'est déroulée les 15 et 16 août 2018 au Centre de Recherche sur le Cancer de l'Université Laval. Organisée par les étudiants du Centre de Recherche, cette journée a rassemblé environ 200 participants provenant des diverses

équipes de recherche en cancérologie fondamentale et clinique, en radio-oncologie ainsi qu'en néphrologie. Plus de 110 stagiaires de premier cycle, étudiants diplômés, professionnels de recherche et stagiaires post-doctoraux ont profité de l'occasion pour présenter leurs travaux de recherche par un exposé oral ou sous forme d'affiche. Cette participation élevée confirme le succès croissant de l'évènement au cours des dernières années.

Les meilleures présentations ont été récompensées par l'octroi de plus de \$9,000 en bourses de congrès et de \$2,000 en prix. Chaque année, les étudiants invitent pour l'évènement un ou plusieurs chercheurs de renommée internationale qui présentent leurs travaux. Pour la 22ème édition, nous avons eu le plaisir d'accueillir le Dr. Tarik Mörry de l'Université de Montréal, et le Dr. Daniel Durocher de l'University of Toronto. Ils ont présenté leurs travaux de recherche portant sur la dynamique des mécanismes de la réparation des dommages à l'ADN, notamment dans le cadre du cancer. Ces deux conférences de très grande qualité ont été appréciées à la fois par les étudiants des différents axes de recherche, mais également par les chercheurs. Le Dr. Durocher a également participé aux évaluations pour la remise de prix aux étudiants. Le comité organisateur tient à remercier la Société Canadienne pour les Biosciences Moléculaires pour sa contribution financière à l'organisation de cette Journée qui contribue à la vie scientifique de notre Centre de Recherche.



Les présentations d'affiche à la Journée Scientifique

University of Toronto Toronto DNA Replication and Repair Symposium

Correspondent: Clare So

On April 20, 2018 at Hart House, University of Toronto, the Toronto DNA Replication and Repair Symposium brought together about 80 researchers from the greater Toronto area to share and discuss their findings. Ten out of twelve invited speakers were graduate students and post-doctoral fellows, representing seven research institutions or groups. In addition, the vast majority of attendees were trainees. Speakers presented research on DNA double-strand break repair, regulation of DNA replication, epigenetics, and targeting genome maintenance factors to selectively kill cancer cells. Faculty members, post-doctoral fellows, and graduate students had the opportunity to network with each other during coffee breaks and lunch.

The symposium itself was organized by a team of five graduate students representing four academic departments at the University of Toronto. Through generous donations from CSMB and other groups, the graduate student organizers were able to invite and host Dr. Karlene Cimprich from Stanford University as the symposium's keynote speaker. This event was special because even though the DNA replication and repair research community in Toronto is sizeable, there had never been a formal venue for researchers to meet, share their expertise, and establish collaborations. As a result of the Symposium, researchers from different institutions and departments were able to become acquainted for the betterment of our entire research community. After the conclusion of the event, several graduate students expressed interest in making the symposium an annual or regular event. The Symposium is currently scheduled to take place once again in 2019.



Dr. Karlene Cimprich answers questions from the audience after her keynote presentation at the Toronto DNA Replication and Repair Symposium

